



ADVENTURES OF THREE ENGLISHMEN AND
THREE RUSSIANS
IN SOUTH AFRICA.

PANNEMAKER.

STORIES
OF
ADVENTURE.

BY
JULES VERNE.

WITH 68 FULL-PAGE ILLUSTRATIONS.

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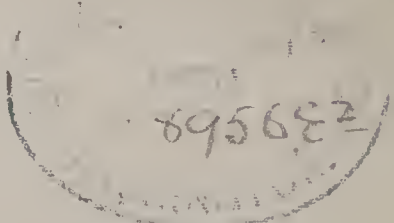
MERIDIANA; THE ADVENTURES OF THREE ENGLISHMEN AND THREE
RUSSIANS IN SOUTH AFRICA.

II.

A JOURNEY TO THE CENTRE OF THE EARTH.

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MERIDIANA;
THE ADVENTURES OF THREE ENGLISHMEN
AND THREE RUSSIANS.

CHAPTER I.

ON THE BANKS OF THE ORANGE RIVER.

ON the 27th of January, 1854, two men lay stretched at the foot of an immense weeping willow, chatting, and at the same time watching most attentively the waters of the Orange River. This river, the Groote of the Dutch, and the Gariep of the Hottentots, may well vie with the other three great arteries of Africa—the Nile, the Niger, and the Zambesi. Like those, it has its periodical risings, its rapids and cataracts. Travellers whose names are known over part of its course, Thompson, Alexander, and Burchell, have each in their turn praised the clearness of its waters, and the beauty of its shores.

At this point the river, as it approached the Duke of

York Mountains, offered a magnificent spectacle to the view. Insurmountable rocks, imposing masses of stone, and trunks of trees that had become mineralized by the action of the weather, deep caverns, impenetrable forests, not yet disturbed by the settler's axe, all these, shut in by a background formed by the mountains of the Gariep, made up a scene matchless in its magnificence. There, too, the waters of the river, on account of the extreme narrowness of their bed, and the sudden falling away of the soil, rushed down from a height of 400 feet. Above the fall there were only surging sheets of water, broken here and there by points of rock wreathed with green boughs ; below, there was only a dark whirlpool of tumultuous waters, crowned with a thick cloud of damp vapour, and striped with all the colours of the rainbow. From this gulf there arose a deafening roar, increased and varied by the echoes of the valley.

Of these two men, who had evidently been brought into this part of South Africa by the chances of an exploration, one lent only a vague attention to the beauties of nature that were opened to his view. This indifferent traveller was a hunting bushman, a fine type of that brave, bright-eyed, rapidly-gesticulating race of men, who lead a wandering life in the woods. Bushman, a word derived from the Dutch "Bochjesman," is literally "a man of the bushes," and is applied to the wandering tribes that scour the country in

the N.W. of Cape Colony. Not a family of these bushmen is sedentary ; they pass their lives in roaming over the region lying between the Orange River and the mountains of the East, in pillaging farms, and in destroying the crops of the overbearing colonists, by whom they have been driven back towards the interior of the country, where more rocks than plants abound.

This bushman, a man of about forty years of age, was very tall, and evidently possessed great muscular strength, for even when at rest his body presented the attitude of action. The clearness, ease, and freedom of his movements stamped him as an energetic character, a man cast in the same mould as the celebrated "Leather-stocking," the hero of the Canadian prairies, though perhaps possessing less calmness than Cooper's favourite hunter, as could be seen by the transient deepening of colour in his face, whenever he was animated by any unusual emotion.

The bushman was no longer a savage like the rest of his race, the ancient Laquas ; for, born of an English father and a Hottentot mother, the half-breed, through his association with strangers, had gained more than he had lost, and spoke the paternal tongue fluently. His costume, half-Hottentot, half-European, consisted of a red flannel shirt, a loose coat and breeches of antelope hide, and leggings made of the skin of a wild cat ; from his neck hung a little bag containing a knife, a pipe, and some tobacco ; he wore

on his head a kind of skull-cap of sheep-skin ; a belt, made from the thick thong of some wild animal, encircled his waist ; and on his naked wrists were rings of ivory, wrought with remarkable skill. From his shoulders flowed a "kross," a kind of hanging mantle, cut out of a tiger's skin, and falling as low as the knees. A dog of native breed was sleeping near him, while he himself was smoking a bone pipe in quick puffs, giving unequivocal signs of impatience.

"Come, let's be calm, Mokoum," said his interlocutor. "You are truly the most impatient of mortals whenever you are not hunting ; but do understand, my worthy companion, that we can't change what is. Those whom we are expecting will come sooner or later—to-morrow, it not to-day."

The bushman's companion was a young man, from twenty-five to twenty-six years of age, and quite a contrast to him. His calm temperament was shown in every action ; and it could be decided without a moment's hesitation that he was an Englishman. His much too homely costume proved him to be unaccustomed to travelling. He gave one the idea of a clerk who had wandered into a savage country, and one looked involuntarily to see if he carried a pen behind his ear, like a cashier, clerk, accountant, or some other variety of the great family of the bureaucracy.

In truth, this young man was not a traveller, but a

distinguished *savant*, William Emery, an astronomer attached to the Observatory at the Cape—a useful establishment, which has for a long time rendered true services to science.

The scholar, rather out of his element, perhaps, in this uninhabited region of South Africa, several hundred miles from Cape Town, could hardly manage to curb the impatience of his companion.

“Mr. Emery,” replied the hunter in good English, “here we have been for eight days at the place appointed on the Orange, the cataract of Morgheda. It is indeed a long time since it has befallen a member of my family to remain eight days in one place: you forget that we are rovers, and that our feet burn at lingering here.”

“My friend Mokoum,” replied the astronomer, “those we are waiting for are coming from England, and surely we can allow them eight days of grace: we must take into account the length of the passage, and the hindrances which a steam-vessel must meet with in ascending the Orange; and, in short, the thousand difficulties belonging to such an undertaking. We have been told to make every preparation for a journey of exploration in South Africa, and that being done, to come here to the Falls of Morgheda and wait for my colleague, Colonel Everest, of the Cambridge Observatory. Well, here are the Falls of Morgheda,

we are at the place appointed, and we are waiting: what more do you want, my worthy bushman?"

The hunter doubtless did want more, for his fingers played feverishly with the lock of his rifle, an excellent Manton, a weapon of precision with conical shot, and which could bring down a wild cat or an antelope at a distance of eight or nine hundred yards. Thus it may be seen that the bushman had put aside the quiver of aloes and the poisoned darts of his fellow-countrymen for the use of European weapons.

"But are you not mistaken, Mr. Emery?" replied Mokoum. "Is it really at the Falls of Morgheda, and towards the end of this month of January, that they have appointed to meet you?"

"Yes, my friend," quietly answered William Emery, "and here is the letter from Mr. Airy, the director of the Greenwich Observatory, which will show you that I am not mistaken."

The bushman took the letter that his companion gave him. He turned it over and over like a man not very familiar with the mysteries of penmanship; then giving it back to William Emery, he said, "Tell me again what the blotted piece of paper says."

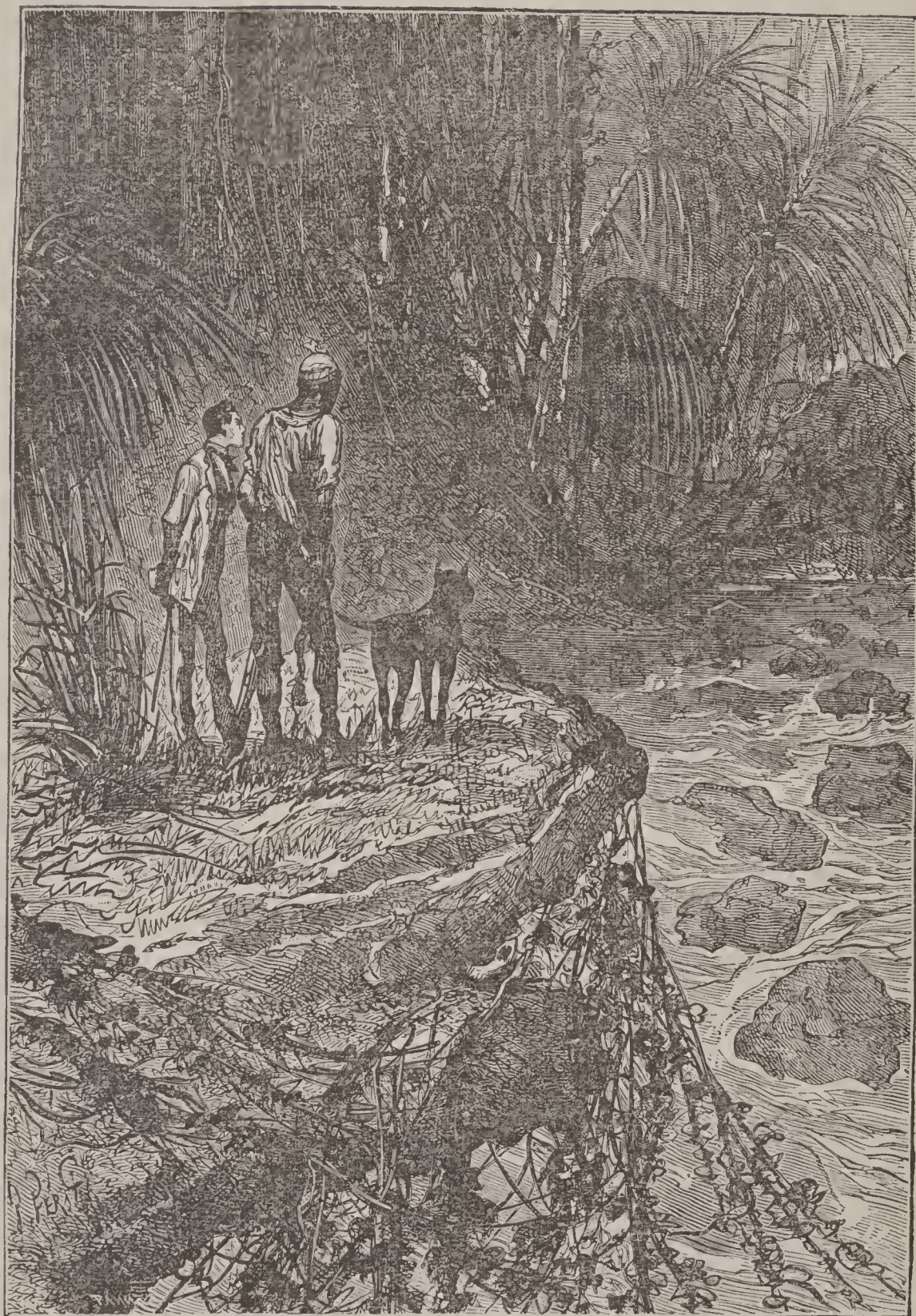
The young astronomer, endowed with a patience proof against every thing, began again, for the twentieth time, the story he had so often told to his friend the hunter. At

the end of the foregoing year, William Emery had received a letter telling him of the approaching arrival of Colonel Everest, and an international scientific commission in Southern Africa. What the plans of the commission were, and why it came to the extremity of the continent of Africa, Emery could not say, Mr. Airy's letter being silent on that point; but following the instructions that he had received, he hastened to Lattakoo, one of the most northern stations in the Hottentot country, to prepare waggons, provisions, and, in short, every thing that could be wanted for the victualling of a Bochjesman caravan. Then, as he knew the reputation of the native hunter, Mokoum, who had accompanied Anderson in his hunting expeditions in Western Africa, and the intrepid David Livingstone on his first journey of exploration to Lake Ngami and the falls of the Zambesi, he offered him the command of this same caravan.

This done, it was arranged that the bushman, who knew the country perfectly, should lead William Emery along the banks of the Orange to the Morgheda Falls, the place appointed for the scientific commission to join them. This commission was to take its passage in the British frigate "Augusta," to reach the mouth of the Orange on the western coast of Africa, as high as Cape Voltas, and to ascend the river as far as the cataracts. William Emery and Mokoum had therefore brought a waggon, which they

had left at the bottom of the valley, to carry the strangers and their baggage to Lattakoo, unless they preferred getting there by the Orange and its affluents, after they had avoided the Falls of Morgheda by a land journey of some miles.

This story ended, and at length really impressed on the bushman's mind, he advanced to the edge of the gulf to whose bottom the foaming river threw itself with a crash : the astronomer followed, for there a projecting point commanded a view of the river, below the cataract, for a distance of several miles. For some minutes Mokoum and his companion gazed attentively at the part of the river where it resumed its tranquillity about a quarter of a mile below them, but not an object, either boat or pirogue, disturbed its course. It was then three o'clock. The month of January here corresponds to the July of northern countries, and the sun, almost vertical in lat. 29° , heated the atmosphere till the thermometer stood at 105° Fahrenheit in the shade. If it had not been for the westerly breeze, which moderated the heat a little, the temperature would have been unbearable for any but a bushman. Still, the young astronomer, with his cool temperament, all bone and all nerves, did not feel it too much : the thick foliage of the trees which overhung the abyss protected him from the direct attacks of the sun's rays. Not a bird enlivened the solitude during these hot hours of the day ; not an animal



William Emery and the Bushman.—[Page 8.]

left the cool shade of the bushes to trust itself along the glades ; not a sound would have been heard in this deserted region, even if the cataract had not filled the whole air with its roar.

After gazing for ten minutes, Mokoum turned to William Emery, stamping impatiently with his large foot ; his penetrating eyes had discovered nothing.

“Supposing your people don’t come?” he asked the astronomer.

“They’ll come, my brave hunter,” answered William Emery : “they are men of their word, and punctual, like all astronomers. Besides, what fault do you find with them ? The letter says they are to arrive at the end of January ; this is the 27th, and these gentlemen have still a right to four more days before they need to reach the Morgheda Falls.”

“And supposing they have not come at the end of those four days ?” asked the bushman.

“Well ! then, master hunter, there will be a chance for us to show our patience, for we will wait for them until I have certain proof that they are not coming at all.”

“By our god Ko !” cried the bushman in a sonorous voice, “you are a man who would wait until the Gariep had emptied all its roaring waters into that abyss !”

“No, hunter, no,” replied Emery in his ever quiet tone ; “but we must let reason govern our actions ; and what does

reason tell us ? This :—that if Colonel Everest and his companions, wearied with a tiresome journey, in want perhaps, and lost in this lonely country, were not to find us at the place of rendezvous, we should be to blame in every way. If any thing went wrong, the responsibility would rest on us ; we ought, therefore, to stay at our post as long as it is our duty to do so. And besides, we want for nothing here : our waggon is waiting for us at the bottom of the valley, and gives us shelter at night ; we have plenty of provisions ; nature here is magnificent and worthy of our admiration ; and it is quite a new pleasure to me to spend a few days in these splendid forests on the banks of this matchless river. As for you, Mokoum, what can you want more ? Game, both hairy and feathered, abounds in the forests, and your rifle keeps us supplied with venison. Hunt, my brave hunter ! kill time by killing deer and buffaloes ! Go, my good bushman ; I'll watch for the loiterers meanwhile, and *your* feet, at any rate, will run no risk of taking root."

The hunter thought the astronomer's advice was good, and decided that he would go for a few hours and beat the neighbouring bushes and brushwood. Lions, hyenas, and leopards would not disturb such a Nimrod as he, so well accustomed to the African forests. He whistled to his dog Top, an animal of the hyena breed from the desert of Kalahari, and a descendant of that race of which the Balabas formerly made pointers. The intelligent creature,

as impatient, seemingly, as his master, bounded up, and showed by his joyous barking how much he was gratified at the bushman's intention. Soon both man and dog disappeared among the thick masses of wood which crowned the background of the cataract. William Emery, now alone, again stretched himself at the foot of the willow, and while he was waiting for the heat to send him to sleep, began to think over his actual position. Here he was, far away from any inhabited spot, on the banks of the Orange river, a river as yet but little explored. He was waiting for Europeans, fellow-countrymen who had left their homes to run the risks of a distant expedition. But what was the expedition for? What scientific problem could it want to solve in the deserts of South Africa? What observation could it be trying to take in lat. 30° S.? That was just what Mr. Airy, the director of the Greenwich Observatory, did not tell in his letter. As for Emery himself, they asked for his co-operation as for that of a scientific man who was familiar with the climate of those southern latitudes, and as he was openly engaged in scientific labours, he was quite at the disposal of his colleagues in the United Kingdom.

As the young astronomer lay musing over all these things, and asking himself a thousand questions which he could not answer, his eyelids became heavy, and at length he slept soundly. When he awoke, the sun was already hidden behind the western hills, whose picturesque outline stood

out sharply against the bright horizon. Some gnawings of hunger told him that supper-time was near ; it was, in fact, six o'clock, and just the hour for returning to the waggon at the bottom of the valley. At that very moment a report resounded from a grove of arborescent heaths, from twelve to fifteen feet high, which was growing along the slope of the hills on the right. Almost immediately the bushman and Top made their appearance at the edge of the wood, the former dragging behind him the animal that he had just shot. "Come, come, master purveyor !" cried Emery, "what have you got for supper ?"

"A springbok, Mr. William," replied the hunter, throwing down an animal with horns curved like a lyre. It was a kind of antelope, more generally known by the name of "leaping buck," and which is to be met with in every part of South Africa. It is a charming animal, with its cinnamon-coloured back, and its croup covered with tufts of silky hair of a dazzling whiteness, whilst its under part is in shades of chestnut brown ; its flesh, always excellent eating, was on this occasion to form the evening repast.

The hunter and the astronomer, lifting the beast by means of a pole placed across their shoulders, now left the head of the cataract, and in half an hour reached their encampment in a narrow gorge of the valley, where the waggon, guarded by two Bochsjesman drivers, was waiting for them.

CHAPTER II.

OFFICIAL PRESENTATIONS.

FOR the next three days, the 28th, 29th, and 30th of January, Mokoum and William Emery never left the place of rendezvous. While the bushman, carried away by his hunting instincts, pursued the game and deer in the wooded district lying near the cataract, the young astronomer watched the river. The sight of this grand, wild nature enchanted him, and filled his soul with new emotions. Accustomed as he was to bend over his figures and catalogues day and night, hardly ever leaving the eye-piece of his telescope, watching the passage of stars across the meridian and their occultations, he delighted in the open-air life in the almost impenetrable woods which covered the slope of the hills, and on the lonely peaks that were sprinkled by the spray from the Morgheda as with a damp dust. It was joy to him to take in the poetry of these vast solitudes, and to refresh his mind, so wearied with his mathe-

mathematical speculations; and so he beguiled the tediousness of his waiting, and became a new man, both in mind and body. Thus did the novelty of his situation explain his unvarying patience, which the bushman could not share in the least; so there were continually on the part of Mokoum the same recriminations, and on the part of Emery the same quiet answers, which, however, did not quiet the nervous hunter in the smallest degree.

And now the 31st of January had come, the last day fixed in Airy's letter. If the expected party did not then arrive, Emery would be in a very embarrassing position; the delay might be indefinitely prolonged. How long, then, ought he to wait?

"Mr. William," said the hunter, "why shouldn't we go to meet these strangers? We cannot miss them; there is only one road, that by the river, and if they are coming up, as your bit of paper says they are, we are sure to meet them."

"That is a capital idea of yours, Mokoum," replied the astronomer: "we will go on and look out below the falls. We can get back to the encampment by the side valleys in the south. But tell me, my good bushman, you know nearly the whole course of the river, do you not?"

"Yes, sir," answered the hunter, "I have ascended it twice from Cape Voltas to its juncture with the Hart on the frontier of the Transvaal Republic."

“And it is navigable all the way, except at the Falls of Morgheda?”

“Just so, sir,” replied the bushman. “But I should add that at the end of the dry season the Orange has not much water till within five or six miles of its mouth; there is then a bar, where the swell from the west breaks very violently.”

“That doesn’t matter,” answered the astronomer, “because at the time that our friends want to land it will be all right. There is nothing then to keep them back, so they will come.”

The bushman said nothing, but shouldering his gun, and whistling to Top, he led the way down the narrow path which met the river again 400 feet lower.

It was then nine o’clock in the morning, and the two explorers (for such they might truly be called) followed the river by its left bank. Their way did not offer the smooth and easy surface of an embankment or towing-path, for the river-banks were covered with brushwood, and quite hidden in a bower of every variety of plants; and the festoons of the “cynauchum filiform,” mentioned by Burchell, hanging from tree to tree, formed quite a network of verdure in their path; the bushman’s knife, however, did not long remain inactive, and he cut down the obstructive branches without mercy. William Emery drank in the fragrant air, here especially impregnated with the camphor-like odour of the countless blooms of the diosma. Happily

there were sometimes more open places along the bank devoid of vegetation, where the river flowed quietly, and abounded in fish, and these enabled the hunter and his companion to make better progress westward, so that by eleven o'clock they had gone about four miles. The wind being in the west, the roar of the cataract could not be heard at that distance, but on the other hand, all sounds below the falls were very distinct. William Emery and the hunter, as they stood, could see straight down the river for three or four miles. Chalk cliffs, 200 feet high, overhung and shut in its bed on either side.

"Let us stop and rest here," said the astronomer; "I haven't your hunter's legs, Mokoum, and am more used to the starry paths of the heavens than to those on terra firma; so let us have a rest; we can see three or four miles down the river from here, and if the steamer should turn that last bend we are sure to see it."

The young astronomer seated himself against a giant euphorbia, forty feet high, and in that position looked down the river, while the hunter, little used to sitting, continued to walk along the bank, and Top roused up clouds of wild birds, to which, however, his master gave no heed. They had been here about half an hour, when William Emery noticed that Mokoum, who was standing about 100 feet below him, gave signs of a closer attention. Was it likely that he had seen the long-expected boat? The astronomer,

leaving his mossy couch, started for the spot where the hunter stood, and came up to him in a very few moments.

“Do you see any thing, Mokoum?” he asked.

“I *see* nothing, Mr. William,” answered the bushman, “but it seems to me that there is an unusual murmur down the river, different to the natural sounds that are so familiar to my ears.” And then, telling his companion to be quiet, he lay down with his ear on the ground, and listened attentively. In a few minutes he got up, and shaking his head, said,—

“I was mistaken; the noise I thought I heard was nothing but the breeze among the leaves or the murmur of the water over the stones at the edge; and yet——”

The hunter listened again, but again heard nothing.

“Mokoum,” then said Mr. William Emery, “if the noise you thought you heard is caused by the machinery of a steamboat, you would hear better by stooping to the level of the river; water always conducts sound more clearly and quickly than air.”

“You are right, Mr. William,” answered Mokoum, “for more than once I have found out the passage of a hippopotamus across the river in that way.”

The bushman went nimbly down the bank, clinging to the creepers and tufts of grass on his way. When he got to the level of the river, he went in to his knees, and stooping down, laid his ear close to the water.

"Yes!" he exclaimed, in a few minutes, "I was not mistaken; there is a sound, some miles down, as if the waters were being violently beaten; it is a continual monotonous splashing which is introduced into the current."

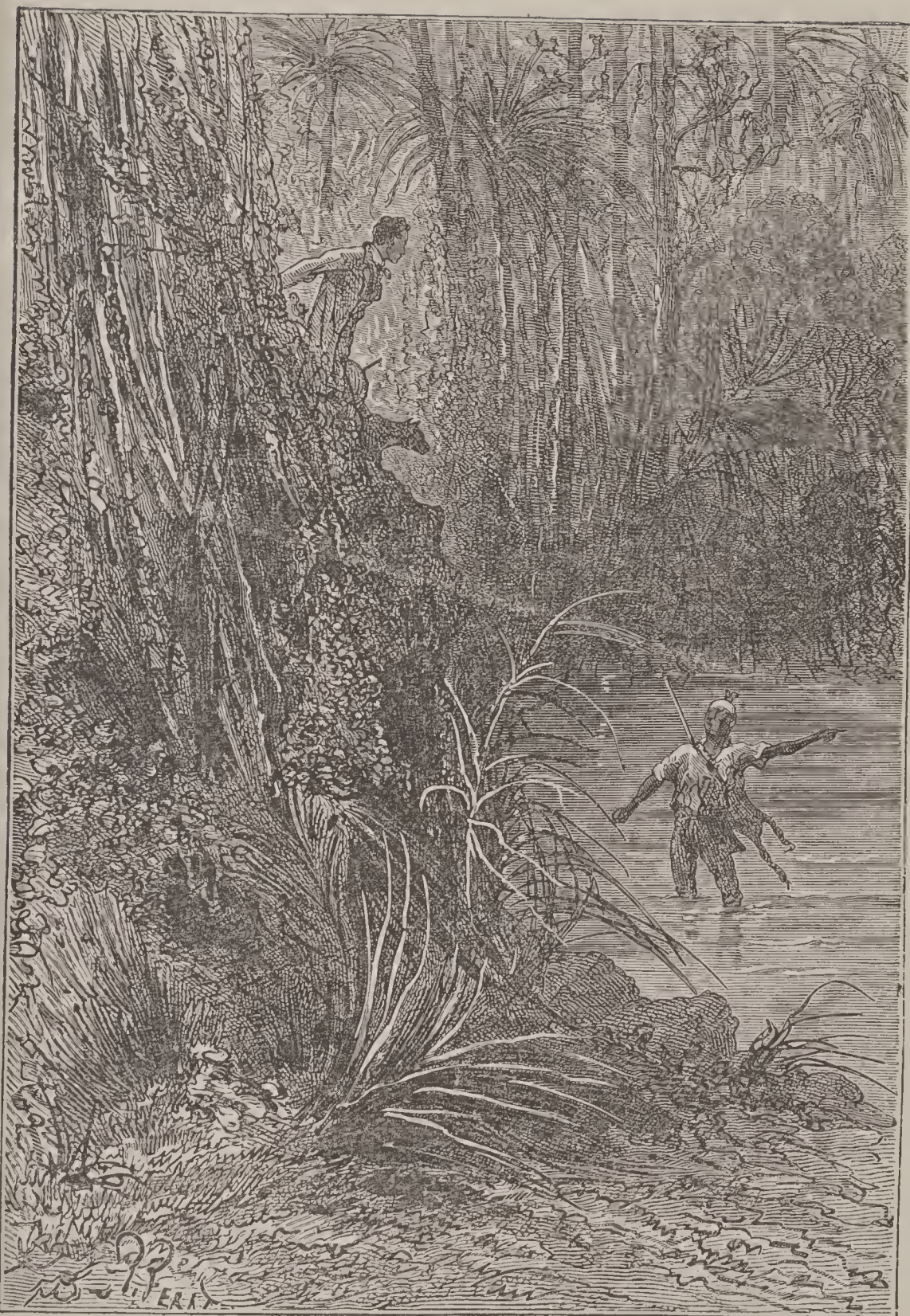
"Is it like a screw?" asked the astronomer.

"Perhaps it is, Mr. Emery; they are not far off."

William Emery did not hesitate to believe his companion's assertion, for he knew that the hunter was endowed with great delicacy of sense, whether he used his eyes, nose, or ears. Mokoum climbed up the bank again, and they determined to wait in that place, as they could easily see down the river from there. Half an hour passed, which to Emery, in spite of his calmness, appeared interminable. Ever so many times he fancied he saw the dim outline of a boat gliding along the water, but he was always mistaken. At last an exclamation from the bushman made his heart leap.

"Smoke!" cried Mokoum.

Looking in the direction indicated by the bushman, Emery could just see a light streak rolling round the bend of the river: there was no longer any doubt. The vessel advanced rapidly, and he could soon make out the funnel pouring forth a torrent of black smoke mingling with white steam. They had evidently made up their fires to increase their speed, so as to reach the appointed place on the exact day. The vessel was still about seven miles from the Falls



At length an exclamation of the Bushman made his heart beat.—[Page 18.]

of Morgheda. It was then twelve o'clock, and as it was not a good place for landing, the astronomer determined to return to the foot of the cataract: he told his plan to the hunter, who only answered by turning back along the path he had just cleared along the left bank of the stream. Emery followed, and, turning round for the last time at a bend in the river, saw the British flag floating from the stern of the vessel. The return to the falls was soon effected, and in an hour's time the bushman and the astronomer halted a quarter of a mile below the cataract; for there the shore, hollowed into a semicircle, formed a little creek, and as the water was deep right up to the bank, the steamboat could easily land its passengers. The vessel could not be far off now, and it had certainly gained on the two pedestrians, although they had walked so fast; it was not yet in sight, for the lofty trees which hung quite over the river-banks into the water, and the slope of the banks themselves, did not allow of an extensive view. But although they could not hear the sound made by the steam, the shrill whistle of the machinery broke in distinctly on the monotonous roar of the cataract; and as this whistling continued, it was evident that it was a signal from the boat to announce its arrival near the falls. The hunter replied by letting off his gun, the report being repeated with a crash by the echoes of the shore. At last the vessel was in sight, and William Emery and his companion were seen by

those on board. At a sign from the astronomer the vessel turned, and glided quietly alongside the bank ; a rope was thrown ashore, which the bushman seized and twisted round the broken stump of a tree, and immediately a tall man sprang lightly on to the bank, and went towards the astronomer, whilst his companions landed in their turn. William Emery also advanced to meet the stranger, saying inquiringly, "Colonel Everest?"

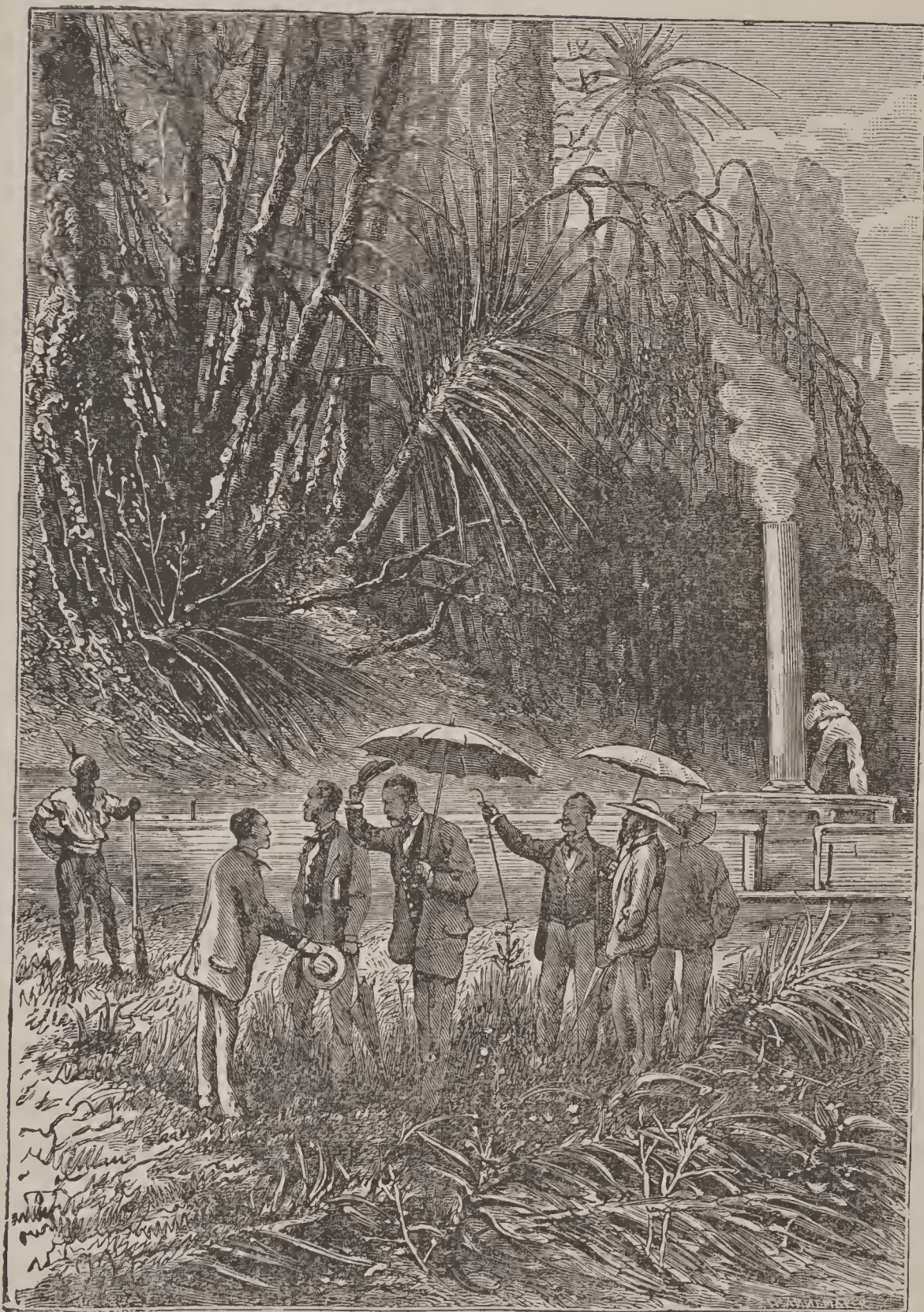
"Mr. William Emery?" answered the Colonel.

The astronomer bowed and shook hands.

"Gentlemen," then said Colonel Everest, "let me introduce you to Mr. William Emery, of the Cape Town Observatory, who has kindly come as far as the Morgheda Falls to meet us."

Four of the passengers who stood near Colonel Everest bowed to the young astronomer, who did the same ; and then the Colonel, with his British self-possession, introduced them officially, saying,—

"Mr. Emery, Sir John Murray, of the county of Devon, your fellow-countryman ; Mr. Matthew Strux, of the Poulkova Observatory ; Mr. Nicholas Palander, of the Helsingfors Observatory ; and Mr. Michael Zorn, of the Kiew Observatory, three scientific gentlemen who represent the Russian government in our international commission."



Meeting of Members of the Expedition.—[Page 20.]

CHAPTER III.

THE LAND JOURNEY.

THESE introductions over, William Emery put himself at the disposal of the new arrivals, for in his position of astronomer at the Cape, he was inferior in rank to Colonel Everest, a delegate of the English Government, and, with Matthew Strux, joint president of the commission. He knew, as well, that he was a distinguished man of science, famous for his reductions of the nebulæ and his calculations of the occultations of the stars. He was a cold, methodical man, of about fifty years of age, every hour of his life being portioned out with mathematical accuracy. Nothing unforeseen ever happened to him, and his punctuality in every thing was like that of the stars in passing the meridian, and it might be said that all his doings were regulated by the chronometer. William Emery knew all this, and had therefore never doubted that the commission would arrive on the appointed day. During this time he was waiting for the Colonel to tell him the object of this mission to South

Africa ; but as he was still silent on the point, Emery thought it better not to ask any questions, as very likely the hour fixed in the Colonel's mind for the subject had not yet come.

Emery also knew by repute the wealthy Sir John Murray, who (almost a rival to Sir James Ross and Lord Elgin) was, although without office, an honour to England by his scientific labours. His pecuniary sacrifices to science were likewise considerable, for he had devoted £20,000 to the establishment of a giant reflector, a match for the telescope at Parson Town, by whose means the elements of a number of double stars had just been determined. He was a man of about forty years of age, with an aristocratic bearing, but whose character it was impossible to discover through his imperturbable exterior.

As to the three Russians, Strux, Palander, and Zorn, their names were also well known to William Emery, although he was not personally acquainted with them. Nicholas Palander and Michael Zorn paid a certain amount of deference to Matthew Strux, as was due to his position, if it had not been to his merit.

The only remark that Emery made was that they were in equal numbers, three English and three Russians ; and the crew of the "Queen and Czar" (for that was the name of the steamboat) consisted of ten men, five English and five Russians.

“Mr. Emery,” said Colonel Everest, when the introductions were over, “we are now as well acquainted as if we had travelled together from London to Cape Voltas. Besides, your labours have already earned you a just renown, and on that account I hold you in high esteem: It was at my request that the English Government appointed you to assist in our operations in South Africa.”

William Emery bowed in acknowledgment, and thought that he was now going to hear the object of the scientific commission to the southern hemisphere; but still Colonel Everest did not explain it.

“Mr. Emery,” he went on, “are your preparations complete?”

“Quite, Colonel,” replied the astronomer. “According to the directions in Mr. Airy’s letter, I left Cape Town a month ago, and went to the station at Lattakoo, and there I collected all the materials for an expedition into the interior of Africa, provisions, waggons, horses, and bushmen. There is an escort of 100 armed men waiting for you at Lattakoo, and they will be under the command of a clever and celebrated hunter, whom I now beg to present to you, the bushman Mokoum.”

“The bushman Mokoum!” cried the Colonel (if his usual cold tone could justify such a verb), “the bushman Mokoum! I know his name perfectly well.”

“It is the name of a clever, brave African.” added Sir

John Murray, turning to the hunter, who was not at all discomposed by the grand airs of the Europeans.

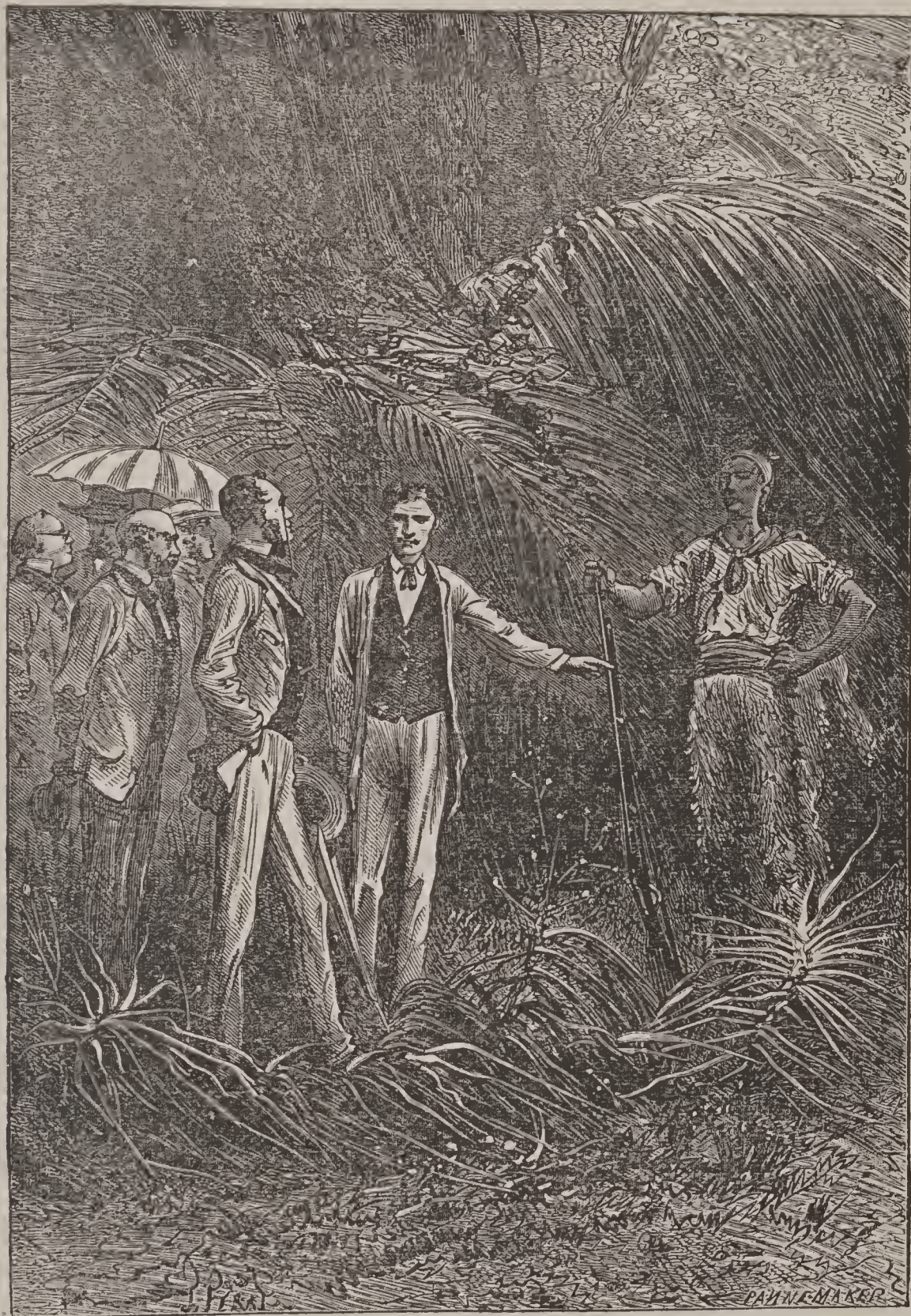
“The hunter Mokoum,” said William Emery, as he introduced his companion.

“Your name is well known in the United Kingdom, bushman,” replied Colonel Everest. “You were the friend of Anderson and the guide of David Livingstone, whose friend I have the honour of being. I thank you in the name of England, and I congratulate Mr. Emery on having chosen you as the chief of our caravan. Such a hunter as you must be a connoisseur of fire-arms, and as we have a very fair supply, I shall beg you to take your choice of the one which will suit you the best ; we know that it will be in good hands.”

A smile of satisfaction played round the bushman’s lips, for although he was no doubt gratified by the recognition of his services in England, yet the Colonel’s offer touched him the most : he then returned thanks in polite terms, and stepped aside, while Emery and the Europeans continued their conversation.

The young astronomer went through all the details of the expedition he had prepared, and the Colonel seemed delighted. He was anxious to reach Lattakoo as quickly as possible, as the caravan ought to start at the beginning of March, after the rainy season.

“Will you be kind enough to decide how you will get to the town, Colonel Everest ?” said William Emery.



“The Hunter Mokoum,” said William Emery, presenting his Companion.
[Page 24.]

“By the Orange River, and one of its affluents, the Kuruman, which flows close to Lattakoo.”

“True,” replied the astronomer, “but however well your vessel may travel, it cannot possibly ascend the cataract of Morgheda!”

“We will go round the cataract, Mr. Emery,” replied the Colonel, “and by making a land journey of a few miles, we can re-embark above the falls; and from there to Lattakoo, if I am not mistaken, the rivers are navigable for a vessel that does not draw much water.”

“No doubt, Colonel,” answered William Emery, “but this steamboat is too heavy . . .”

“Mr. Emery,” interrupted the Colonel, “this vessel is a masterpiece from Leard and Co’s manufactory in Liverpool. It takes to pieces, and is put together again with the greatest ease, a key and a few bolts being all that is required by men used to the work. You brought a waggon to the falls, did you not?”

“Yes, Colonel,” answered Emery, “our encampment is not a mile away.”

“Well, I must beg the bushman to have the waggon brought to the landing-place, and it will then be loaded with the portions of the vessel and its machinery, which also takes to pieces; and we shall then get up to the spot where the Orange becomes navigable.”

Colonel Everest’s orders were obeyed. The bushman

disappeared quickly in the underwood, promising to be back in less than an hour, and while he was gone, the steamboat was rapidly unloaded. The cargo was not very considerable ; it consisted of some cases of philosophical instruments ; a fair collection of guns of Purdey Moore's manufacture, of Edinburgh ; some kegs of brandy ; some canisters of preserved meat ; cases of ammunition ; port-manteaus reduced to the smallest size ; tent-cloths and all their utensils, looking as if they had come out of a travelling-bazaar ; a carefully packed gutta-percha canoe, which took up no more room than a well-folded counterpane ; some materials for encamping, &c., &c. ; and lastly, a fan-shaped mitrailleuse, a machine not then brought to perfection, but formidable enough to terrify any enemy who might come across their path. All these were placed on the bank ; and the engine, of 8-horse power, was divided into three parts : the boiler and its tubes ; the mechanism, which was parted from the boiler by a turn of a key ; and the screw attached to the false stern-post. When these had been successively carried away, the inside of the vessel was left free. Besides the space reserved for the machinery and the stores, it was divided into a fore-cabin for the use of the crew, and an aft-cabin, occupied by Colonel Everest and his companions. In the twinkling of an eye the partitions vanished, all the chests and bedsteads were lifted out, and now the vessel was reduced to a mere



All these Objects were deposited on the Beach.—[Page 26.]

shell, thirty-five feet long, and composed of three parts, like the "Mâ-Robert," the steam-vessel used by Dr. Livingstone in his first voyage up the Zambesi. It was made of galvanized steel, so that it was light, and at the same time resisting. The bolts, which fastened the plates over a framework of the same metal, kept them firm, and also prevented the possibility of a leakage. William Emery was truly astounded at the simplicity of the work and the rapidity with which it was executed. The waggon, under the guidance of Mokoum and the two Bochjesmen, had only arrived an hour when they were ready to load it. This waggon, rather a primitive vehicle, was mounted on four massive wheels, each couple being about twenty feet apart; it was a regular American "car" in length. This clumsy machine, with its creaking axles projecting a good foot beyond the wheels, was drawn by six tame buffaloes, two and two, who were extremely sensitive to the long goad carried by their driver. It required nothing less than such beasts as these to move the vehicle when heavily laden, for in spite of the adroitness of the "leader," it stuck in the mire more than once. The crew of the "Queen and Czar" now proceeded to load the waggon so as to balance it well every where. The dexterity of sailors is proverbial, and the lading of the vehicle was like play to the brave men. They laid the larger pieces of the boat on the strongest part of the waggon, immediately over the axles of the

wheels, so that the cases, chests, barrels, and the lighter and more fragile packages easily found room between them. As to the travellers themselves, a four miles' walk was nothing to them. By three o'clock the loading was finished, and Colonel Everest gave the signal for starting. He and his companions, with William Emery as guide, took the lead, while the bushman, the crew, and the drivers of the waggon followed more slowly. They performed the journey without fatigue, for the slopes that led to the upper course of the Orange made their road easy, by making it longer, and this was a happy thing for the heavily-laden waggon, as it would thus reach its goal more surely, if more slowly.

The different members of the commission clambered lightly up the side of the hill, and the conversation became general, but there was still no mention of the object of the expedition. The Europeans were admiring the splendid scenes that were opened to their view, for this grand nature, so beautiful in its wildness, charmed them as it had charmed the young astronomer, and their voyage had not yet surfeited them with the natural beauties of this African region, though they admired every thing with a quiet admiration, and, English-like, would not do any thing that might seem "improper." However, the cataract drew forth some graceful applause, and although they clapped perhaps with only the tips of their fingers, yet it was enough to show that

“nil admirari” was not quite their motto. Besides, William Emery thought it his duty to do the honours of South Africa to his guests; for he was at home, and like certain over-enthusiastic citizens, he did not spare a detail of his African park. Towards half-past four they had passed the cataract of Morgheda, and being now on level ground, the upper part of the river lay before them as far as their eye could reach, and they encamped on the bank to await the arrival of the waggon. It appeared at the top of the hill about five o’clock, having accomplished the journey in safety, and Colonel Everest ordered it to be unloaded immediately, announcing that they were to start at day-break the next morning. All the night was passed in different occupations. The shell of the vessel was put together again in less than an hour; then the machinery of the screw was put into its place; the metal partitions were fixed between the cabins; the store-rooms were re-furnished, and the different packages neatly arranged on board, and every thing done so quickly that it told a great deal in favour of the crew of the “Queen and Czar.” These Englishmen and Russians were picked men, clever and well disciplined, and thoroughly to be depended on. The next day, the 1st of February, the boat was ready to receive its passengers at daybreak. Already there was a volume of black smoke pouring from the funnel, and the engineer, to put the machinery in motion, was causing jets

of white steam to fly across the smoke. The machine being at high pressure, without a condenser, the steam escaped at every stroke of the piston, according to the system applied to locomotives; and as to the boiler, with its ingeniously contrived tubes, presenting a large surface to the furnace, it only required half an hour to furnish a sufficient quantity of steam. They had laid in a good stock of ebony and guiacum, which were plentiful in the neighbourhood, and they were now lighting the great fire with this valuable wood.

At six o'clock Colonel Everest gave the signal for starting, and passengers and crew went on board the "Queen and Czar." The hunter, who was acquainted with the course of the river, followed, leaving the two Bochjesmen to take the waggon back to Lattakoo. Just as the vessel was slipping its cable, Colonel Everest turned to the astronomer, and said,—

"By-the-bye, Mr. Emery, you know why we have come here?"

"I have not the least idea, Colonel."

"It is very simple, Mr. Emery: we have come to measure an arc of meridian in South Africa."

CHAPTER IV.

A FEW WORDS ABOUT THE "MÈTRE."

THE idea of an invariable and constant system of measurement, of which nature herself should furnish the exact value, may be said to have existed in the mind of man from the earliest ages. It was of the highest importance, however, that this measurement should be accurately determined, whatever had been the cataclysms of which our earth had been the scene, and it is certain that the ancients felt the same, though they failed in methods and appliances for carrying out the work with sufficient accuracy. The best way of obtaining a constant measurement was to connect it with the terrestrial sphere, whose circumference must be considered as invariable, and then to measure the whole or part of that circumference mathematically. The ancients had tried to do this, and Aristotle, according to some contemporary philosophers, reckoned that the stadium, or Egyptian cubit, formed the hundred-thousandth part of the distance between the pole and the equator, and Eratos-

thenes, in the time of the Ptolemies, calculated the value of a degree along the Nile, between Syene and Alexandria, pretty correctly ; but Posidonius and Ptolemy were not sufficiently accurate in the same kind of geodetic operations that they undertook ; neither were their successors.

Picard, for the first time in France, began to regulate the methods that were used for measuring a degree, and in 1669, by measuring the celestial and terrestrial arcs between Paris and Amiens, found that a degree was equal to 57,060 toises, equivalent to 364,876 English feet, or about 69.1 miles. Picard's measurement was continued either way across the French territory as far as Dunkirk and Collioure by Dominic Cassini and Lahire (1683—1718), and it was verified in 1739, from Dunkirk to Perpignan, by Francis Cassini and Lacaille ; and at length Méchain carried it as far as Barcelona in Spain ; but after his death (for he succumbed to the fatigue attending his operations) the measurement of the meridian in France was interrupted until it was subsequently taken up by Arago and Biot in 1807. These two men prolonged it as far as the Balearic Isles, so that the arc now extended from Dunkirk to Formentera, being equally divided by the parallel of lat. 45° N., half way between the pole and the equator ; and under these conditions it was not necessary to take the depression of the earth into account in order to find the value of the

quadrant of the meridian. This measurement gave 57,025 toises as the mean value of an arc of a degree in France.

It can be seen that up to that time Frenchmen especially had undertaken to determine that delicate point, and it was likewise the French Convention that, according to Talleyrand's proposition, passed a resolution in 1790, charging the Academy of Sciences to invent an invariable system of weights and measures. Just at that time the statement signed by the illustrious names of Borda, Lagrange, Laplace, Monge, and Condorcet, proposed that the unit of measure should be the *mètre*, the ten-millionth part of the quadrant of the meridian; and that the unit of weight should be the *gramme*, a cubic centimètre of distilled water at the freezing-point; and that the multiples and subdivisions of every measure should be formed decimally.

Later, the determinations of the value of a terrestrial degree were carried on in different parts of the world, for the earth being not spherical, but elliptic, it required much calculation to find the depression at the poles.

In 1736, Maupertuis, Clairaut, Camus, Lemonnier, Outhier, and the Swedish Celsius measured a northern arc in Lapland, and found the length of an arc of a degree to be 57,419 toises. In 1745, La Condamine, Bouguer, and Godin, set sail for Peru, where they were joined by the Spanish officers Juan and Antonio Ulloa, and they then found that the Peruvian arc contained 56,737 toises.

In 1752, Lacaille reported 57,037 toises as the length of the arc he had measured at the Cape of Good Hope.

In 1754, Father Boscowitch and Father le Maire began a survey of the Papal States, and in the course of their operations found the arc between Rome and Rimini to be 56,973 toises.

In 1762 and 1763, Beccaria reckoned the degree in Piedmont at 57,468 toises, and in 1768, the astronomers Mason and Dixon, in North America, on the confines of Maryland and Pennsylvania, found that the value of the degree in America was 56,888 toises.

Since the beginning of the 19th century numbers of other arcs have been measured, in Bengal, the East Indies, Piedmont, Finland, Courland, East Prussia, Denmark, &c., but the English and Russians were less active than other nations in trying to decide this delicate point, their principal geodetic operation being that undertaken by General Roy in 1784, for the purpose of determining the difference of longitude between Paris and Greenwich.

It may be concluded from all the above-mentioned measurements that the mean value of a degree is 57,000 toises, or 25 ancient French leagues, and by multiplying this mean value by the 360 degrees contained in the circumference, it is found that the earth measures 9000 leagues round. But, as may be seen from the figures above, the measurements of the different arcs in different parts of the world do

not quite agree. Nevertheless, by taking this average of 57,000 toises for the value of a degree, the value of the mètre, that is to say, the ten-millionth part of the quadrant of the meridian, may be deduced, and is found to be 0.513074 of the whole line, or 39.37079 English inches. In reality, this value is rather too small, for later calculations (taking into account the depression of the earth at the poles, which is $\frac{1}{299.15}$ and not $\frac{1}{134}$, as was thought at first) now give nearly 10,000,856 mètres instead of 10,000,000 for the length of the quadrant of the meridian. The difference of 856 mètres is hardly noticeable in such a long distance ; but nevertheless, mathematically speaking, it cannot be said that the mètre, as it is now used, represents the ten-millionth part of the quadrant of the terrestrial meridian exactly ; there is an error of about $\frac{1}{5000}$ of a line, i. e. $\frac{1}{5000}$ of the twelfth part of an inch.

The mètre, thus determined, was still not adopted by all the civilized nations. Belgium, Spain, Piedmont, Greece, Holland, the old Spanish colonies, the republics of the Equator, New Granada, and Costa Rica, took a fancy to it immediately ; but notwithstanding the evident superiority of this metrical system to every other, England had refused to use it. Perhaps if it had not been for the political disturbances which arose at the close of the 18th century, the inhabitants of the United Kingdom would have accepted the system, for when the Con-

stituent Assembly issued its decree on the 8th of May, 1790, the members of the Royal Society in England were invited to co-operate with the French Academicians. They had to decide whether the measure of the mètre should be founded on the length of the pendulum that beats the sexagesimal second, or whether they should take a fraction of one of the great circles of the earth for a unit of length ; but events prevented the proposed conference, and so it was not until the year 1854 that England, having long seen the advantage of the metrical system, and that scientific and commercial societies were being founded to spread the reform, resolved to adopt it. But still the English Government wished to keep their resolution a secret until the new geodetic operations that they had commenced should enable them to assign a more correct value to the terrestrial degree, and they thought they had better act in concert with the Russian Government, who were also hesitating about adopting the system. A Commission of three Englishmen and three Russians was therefore chosen from among the most eminent members of the scientific societies, and we have seen that they were Colonel Everest, Sir John Murray, and William Emery, for England ; and Matthew Strux, Nicholas Palander, and Michael Zorn, for Russia. The international Commission having met in London, decided first of all that the measure of an arc of meridian should be taken in the Southern hemisphere, and

that another arc should subsequently be measured in the Northern hemisphere, so that from the two operations they might hope to deduce an exact value which should satisfy all the conditions of the programme. It now remained to choose between the different English possessions in the Southern hemisphere, Cape Colony, Australia, and New Zealand. The two last, lying quite at the antipodes of Europe, would involve the Commission in a long voyage, and, besides, the Maoris and Australians, who were often at war with their invaders, might render the proposed operation difficult; while Cape Colony, on the contrary, offered real advantages. In the first place, it was under the same meridian as parts of European Russia, so that after measuring an arc of meridian in South Africa, they could measure a second one in the empire of the Czar, and still keep their operations a secret; secondly, the voyage from England to South Africa was comparatively short; and thirdly, these English and Russian philosophers would find an excellent opportunity there of analyzing the labours of the French astronomer Lacaille, who had worked in the same place, and of proving whether he was correct in giving 57,037 toises as the measurement of a degree of meridian at the Cape of Good Hope. It was therefore decided that the geodetic operation should be commenced at the Cape, and as the two Governments approved of the decision, large credits were opened,

and two sets of all the instruments required in a triangulation were manufactured. The astronomer William Emery was asked to make preparations for an exploration in the interior of South Africa, and the frigate "Augusta," of the royal navy, received orders to convey the members of the Commission and their suite to the mouth of the Orange River.

It should here be added, that besides the scientific question, there was also a question of national vainglory that excited these philosophers to join in a common labour; for, in reality, they were anxious to out-do France in her numerical calculations, and to surpass in precision the labours of her most illustrious astronomers, and that in the heart of a savage and almost unknown land. Thus the members of the Anglo-Russian Commission had resolved to sacrifice every thing, even their lives, in order to obtain a result that should be favourable to science, and at the same time glorious for their country. And this is how it came to pass that the astronomer William Emery found himself at the Morgheda Falls, on the banks of the Orange River, at the end of January, 1854.

CHAPTER V.

A HOTTENTOT VILLAGE.

THE voyage along the upper course of the river was soon accomplished, and although the weather soon became rainy, the passengers, comfortably installed in the ship's cabin, suffered no inconvenience from the torrents of rain which usually fall at that season. The "Queen and Czar" shot along rapidly, for there were neither rapids nor shallows, and the current was not sufficiently strong to retard her progress. Every aspect of the river-banks was enchanting; forest followed upon forest, and quite a world of birds dwell among the leafy branches. Here and there were groups of trees belonging to the family of the "proteaceæ," and especially the "wagenboom" with its reddish marbled-wood, forming a curious contrast with its deep blue leaves and large pale yellow flowers: then there were the "zwarte-basts" with their black bark, and the "karrees" with dark evergreen foliage. The banks were shaded every where by weeping willows, while the underwood extended beyond

for several miles. Every now and then vast open tracks presented themselves unexpectedly, large plains, covered with innumerable colocynths, mingled with "sugar-bushes," out of which flew clouds of sweet-singing little birds, called "suiker-vogels" by the Cape colonists. The winged world offered many varieties, all of which were pointed out to Sir John Murray by the bushman. Sir John was a great lover of game, both hairy and feathered, and thus a sort of intimacy arose between him and Mokoum, to whom, according to Colonel Everest's promise, he had given an excellent long-range rifle, made on the Pauly system. It would be useless to attempt a description of the bushman's delight when he found himself in possession of such a splendid weapon. The two hunters understood each other well, for though so learned, Sir John Murray passed for one of the most brilliant fox-hunters in old Caledonia, and he listened to the bushman's stories with an interest amounting to envy. His eyes sparkled when Mokoum showed him the wild ruminants in the woods; here a herd of fifteen to twenty giraffes; there, buffaloes six feet high, with towering black horns: farther on, fierce gnus with horses' tails; and again, herds of "caamas," a large kind of deer, with bright eyes, and horns forming a threatening-looking triangle; and every where, in the dense forests as well as in the open plains, the innumerable varieties of antelopes which abound in Southern Africa; the spurious chamois, the gems-bok,

the gazelle, the duiker-bok, and the spring-bok. Was not all this something to tempt a hunter, and could the fox-hunts of the Scottish lowlands vie with the exploits of a Cumming, an Anderson, or a Baldwin? It must be confessed that Sir John Murray's companions were less excited than himself at these magnificent specimens of wild game. William Emery was watching his colleagues attentively, and trying to discover their character under their cold exterior. Colonel Everest and Matthew Strux, men of about the same age, were equally cold, reserved, and formal; they always spoke with a measured slowness, and from morning to night it seemed as if they had never met before. That any intimacy should ever be established between two such important personages was a thing not to be hoped for; two icebergs, placed side by side would join in time, but two scientific men, each holding a high position, never.

Nicholas Palander, a man of about fifty-five years of age, was one of those who have never been young, and who will never be old. The astronomer of Helsingfors, constantly absorbed in his calculations, might be a very admirably constructed machine, but still he was nothing but a machine, a kind of abacus, or universal reckoner. He was the calculator of the Anglo-Russian Commission, and one of those prodigies who work out multiplications to five figures in their head, like a fifty-year-old Mondeux.

Michael Zorn more nearly resembled William Emery in age, enthusiasm, and good humour. His amiable qualities did not prevent his being an astronomer of great merit, having attained an early celebrity. The discoveries made by him at the Kiew Observatory concerning the nebula of Andromeda had attracted attention in scientific Europe, and yet with this undoubted merit he had a great deal of modesty, and was always in the background. William Emery and Michael Zorn were becoming great friends, united by the same tastes and aspirations; and most generally they were talking together, while Colonel Everest and Matthew Strux were coldly watching each other, and Palander was mentally extracting cube roots without noticing the lovely scenes on the banks, and Sir John Murray and the bushman were forming plans for hunting down whole hecatombs of victims.

No incident marked the voyage along the upper course of the Orange. Sometimes the granite cliffs which shut in the winding bed of the river seemed to forbid further progress, and often the wooded islands which dotted the current seemed to render the route uncertain; but the bushman never hesitated, and the "Queen and Czar" always chose the right route, and passed round the cliffs without hindrance. The helmsman never had to repent of having followed Mokoum's directions.

In four days the steamboat had passed over the 240 miles

between the cataract of Morgheda and the Kuruman, an affluent which flowed exactly past the town of Lattakoo, whither Colonel Everest's expedition was bound. About thirty leagues above the falls the river bends from its general direction, which is east and west, and flows south-east as far as the acute angle which the territory of Cape Colony makes in the north, and then turning to the north-east, it loses itself in the wooded country of the Transvaal Republic. It was early in the morning of the 5th of February, in a driving rain, that the "Queen and Czar" arrived at Klaarwater, a Hottentot village, close to the meeting of the Orange and Kuruman. Colonel Everest, unwilling to lose a moment, passed quickly by the few Bochjesmen cabins that form the village, and under the pressure of her screw, the vessel began to ascend the affluent. The rapid current was to be attributed, as the passengers remarked, to a peculiarity in the river, for the Kuruman being wide at its source, was lessened as it descended by the influence of the sun's rays; but at this season, swollen by the rains, and further increased by the waters of a sub-affluent, the Moschona, it became very deep and rapid. The fires were therefore made up, and the vessel ascended the Kuruman at the rate of three miles an hour.

During the voyage the bushman pointed out a good many hippopotami in the water; but these great pachy-

derms, clumsy, thickset beasts, from eight to ten feet long, which the Dutch at the Cape call "sea-cows," were by no means of an aggressive nature, and the hissing of the steam and the panting of the screw quite frightened them, the boat appearing to them like some great monster which they ought to distrust, and in fact, the arsenal on board would have rendered approach very difficult. Sir John Murray would have very much liked to try his explosive bullets on the fleshy masses, but the bushman assured him that there would be no lack of hippopotami in the more northerly rivers, so he determined to wait for a more favourable opportunity.

The 150 miles which separated the mouth of the Kuruman from the station of Lattakoo were traversed in fifty hours, and on the 7th of February the travellers had reached the end of their journey. As soon as the steamboat was moored to the bank which served as a quay, a man of fifty years of age, with a grave air but kind countenance, stepped on board, and offered his hand to William Emery. The astronomer introduced the new-comer to his travelling companions, as—

"The Rev. Thomas Dale, of the London Missionary Society, Governor of the station of Lattakoo."

The Europeans bowed to Mr. Dale, who gave them welcome, and put himself at their service.

The town of Lattakoo, or rather the village of that name,



The Mission Home Establishment.—[Page 44.]



is the most northerly of the Cape Missionary stations, and is divided into Old and New. The first, which the "Queen and Czar" now reached, had 12,000 inhabitants at the beginning of the century, but they have since emigrated to the north-east, and the town, now fallen into decay, has been replaced by New Lattakoo, which is built close by, on a plain which was formerly covered with acacias, and thither Mr. Dale conducted the Europeans. It consisted of about forty groups of houses, and contained 5000 or 6000 inhabitants of the tribe of the Bechuanas. Dr. Livingstone stayed in this town for three months before his first voyage up the Zambesi in 1840, previously to crossing the whole of Central Africa, from the bay of Loanda to the port of Kilmana on the coast of Mozambique.

When they reached New Lattakoo, Colonel Everest presented a letter from Dr. Livingstone, which commended the Anglo-Russian Commission to his friends in South Africa. Mr. Dale read it with much pleasure, and returned it to the Colonel, saying that he might find it useful on his journey, as the name of David Livingstone was known and honoured throughout that part of Africa.

The members of the Commission were lodged in the missionary establishment, a large house built on an eminence and surrounded by an impenetrable hedge like a fortification. The Europeans could be more comfortably lodged here than with the Bechuanas; not that their dwellings

were not kept properly in order; on the contrary, the smooth clay floors did not show a particle of dust, and the long-thatched roofs were quite rain-proof; but at best, their houses were little better than huts with a round hole for a door, hardly large enough to admit a man; moreover, they all lived in common, and close contact with the Bechuanas would scarcely have been agreeable.

The chief of the tribe, one Moulibahan, lived at Lattakoo, and thought it right to come and pay his respects to the Europeans. He was rather a fine man, without the thick lips and flat nose of the negro, with a round face not so shrunken in its lower part as that of the other Hottentots. He was dressed in a cloak of skins, sewn together with considerable art, and an apron called a "pujoke." He wore a leather skull-cap, and sandals of ox-hide: ivory rings were wound round his arms, and from his ears hung brass plates about four inches long—a kind of ear-ring—which is also a charm; an antelope's tail stood up in his skull-cap, and his hunting-stick was surmounted by a tuft of small black ostrich feathers. The natural colour of his body was quite invisible through the thick coating of ochre with which he was besmeared from head to foot, while some ineffaceable incisions in his legs denoted the number of enemies he had slain.

The chief, as grave as Matthew Strux himself, stepped





Chief Moulbahan. — [Page 46.]

up to the Europeans, and took them in turn by the nose. The Russians permitted this to be done quite gravely, the English rather more reluctantly, but still it had to be done, for according to African custom, it denoted a solemn engagement to fulfil the duties of hospitality to the Europeans. When the ceremony was over, Moulibahan retired without having uttered a word.

“And now that we are naturalized Bechuanas,” said Colonel Everest, “let us begin our operations without losing a day or an hour.”

And indeed no time was lost ; still, such is the variety of detail required in the organization of an expedition of this character, the Commission was not ready to start until the beginning of March. That, however, was the time appointed by Colonel Everest ; because then the rainy season just being over, the water, preserved in the fissures of the earth, would furnish a valuable resource to travellers in the desert.

On the 2nd of March, then, the whole caravan, under Mokoum’s command, was ready. The Europeans took farewell of the missionaries at Lattakoo, and left the village at seven o’clock in the morning.

“Where are we going, Colonel ?” asked William Emery, as the caravan passed the last house in the town.

“Straight on, Mr. Emery,” answered the Colonel, “until we reach a suitable place for establishing a base.”

At eight o'clock the caravan had passed over the low shrubby hills which skirt the town, and soon the desert, with its dangers, fatigues, and risks, lay unfolded before the travellers.

CHAPTER VI.

BETTER ACQUAINTANCE.

THE escort under the bushman's command was composed of 100 men, all Bochjesmen—an industrious, good-tempered people, capable of enduring great physical fatigue. In former times, before the arrival of the missionaries, these Bochjesmen were a lying, inhospitable race, thinking of nothing but murder and pillage, and ever taking advantage of an enemy's sleep to massacre him. To a great extent the missionaries have modified these barbarous habits, but the natives are still more or less farm-pillagers and cattle-lifters.

Ten waggons, like the vehicle which Mokoum had taken to the Morgheda Falls, formed the bulk of the expedition. Two of these were like moving houses, fitted up as they were with a certain amount of comfort, and served as an encampment for the Europeans; so that Colonel Everest and his companions were followed about by a wooden habitation with dry flooring, and well tilted with water-

proof cloth, and furnished with beds and toilet furniture. Thus, on arriving at each place of encampment, the tent was always ready pitched. Of these waggons, one was appropriated to Colonel Everest and his countrymen, Sir John Murray and William Emery: the other was used by the Russians, Matthew Strux, Nicholas Palander, and Michael Zorn. Two more, arranged in the same way, belonged, one to the five Englishmen and the other to the five Russians who composed the crew of the "Queen and Czar."

The hull and machinery of the steamboat, taken to pieces and laid on one of the waggons, followed the travellers, in case the Commission might come across some of the numerous lakes which are found in the interior of the continent.

The remaining waggons carried the tools, provisions, baggage, arms, and ammunition, as well as the instruments required for the proposed triangular survey. The provisions of the Bochjesmen consisted principally of antelope, buffalo, or elephant meat, preserved in long strips, being dried in the sun or by a slow fire: thus economizing the use of salt, here very scarce. In the place of bread, the Bochjesmen depended on the earth-nuts of the arachis, the bulbs of various species of mesembryanthemums, and other native productions. Animal food would be provided by the hunters of the party, who, adroitly employing their

bows and lances, would scour the plains and revictual the caravan.

Six native oxen, long-legged, high-shouldered, and with great horns, were attached to each waggon with harness of buffalo hide. Thus the primitive vehicles moved slowly though surely on their massive wheels, ready alike for heights or valleys. For the travellers to ride there were provided small black or grey Spanish horses, good-tempered, brave animals, imported from South America, and much esteemed at the Cape. Among the troops of quadrupeds were also half-a-dozen tame quaggas, a kind of ass with plump bodies and slender legs, who make a noise like the barking of a dog. They were to be used in the smaller expeditions necessary to the geodetic operations, and were adapted to carry the instruments where the waggons could not venture. The only exception to the others was the bushman, who rode a splendid zebra with remarkable grace and dexterity. This animal (the beauty of whose coat with its brown stripes especially excited the admiration of the connoisseur Sir John Murray) was naturally defiant and suspicious, and would not have borne any other rider than Mokoum, who had broken it in for his own use. Some dogs of a half-savage breed, sometimes wrongly called "hyena-hunters," ran by the side of the waggons, their shape and long ears reminding one of the European brach-hound.

Such was the caravan which was about to bury itself in the deserts. The oxen advanced calmly under the guidance of their drivers, ever and again pricking them in the flank with their "jambox;" and it was strange to see the troop winding along the hills in marching order. After leaving Lattakoo, whither was the expedition going? Colonel Everest had said, "Straight on;" and indeed he and Matthew Strux could not yet follow a fixed course. What they wanted, before commencing their trigonometrical operations, was a vast level plain, on which to establish the base of the first of the triangles, which, like a network, were to cover for several degrees the southern part of Africa. The Colonel explained to the bushman what he wanted, and with the calmness of one to whom scientific language is familiar, talked to him of triangles, adjacent angles, bases, meridians, zenith distances, and the like. Mokoum let him go on for a few moments, then interrupted him with an impatient movement, saying, "Colonel, I don't know any thing about your angles, bases, and meridians. I don't understand even in the least what you are going to do in the desert: but that is your business. You are asking for a large level plain; oh well, I can find you that."

And at his orders, the caravan, having just ascended the Lattakoo hills, turned down again towards the south-west. This took them rather more to the south of the village.



William Emery and Michael Zorn in advance of the Expedition.—[Page 53.]

towards the plain watered by the Kuruman, and here the bushman expected to find a suitable place for the Colonel's plans. From that day, he always took the head of the caravan. Sir John Murray, well mounted, never left him, and from time to time the report of a gun made his colleagues aware that he was making acquaintance with the African game. The Colonel, quite absorbed in contemplating the difficulties of the expedition, let his horse carry him on. Matthew Strux, sometimes on horseback, sometimes in the waggon, according to the nature of the ground, seldom opened his lips. Nicholas Palander, as bad a rider as could be, was generally on foot; at other times he shut himself up in his vehicle, and there lost himself in the profoundest mathematical abstractions.

Although William Emery and Michael Zorn occupied separate waggons at night, they were always together when the caravan was on the march. Every day and every incident of the journey bound them in a closer friendship. From one stage to another they rode, talked, and argued together. Sometimes they fell behind the train, and sometimes rode on several miles ahead of it, when the plain extended as far as they could see. They were free here and lost amidst the wildness of nature. How they forgot figures and problems, calculations and observations, and chatted of every thing but science! They were no longer astronomers contemplating the starry

firmament, but were more like two youths escaped from school, revelling in the dense forests and boundless plains. They laughed like ordinary mortals. Both of them had excellent dispositions, open, amiable, and devoted, forming a strange contrast to Colonel Everest and Matthew Strux, who were formal, not to say stiff. These two chiefs were often the subject of their conversation, and Emery learnt a good deal about them from his friend.

“Yes,” said Michael Zorn, that day, “I watched them well on board the ‘Augusta,’ and I profess I think they are jealous of each other. And if Colonel Everest appears to be at the head of things, Matthew Strux is not less than his equal: the Russian Government has clearly established his position. One chief is as imperious as the other; and besides, I tell you again, there is the worst of all jealousy between them, the jealousy of the learned.”

“And that for which there is the least occasion,” answered Emery, “because in discoveries every thing has its value, and each one derives equal benefit. But, my dear Zorn, if, as I believe, your observations are correct, it is unfortunate for our expedition: in such a work there ought to be a perfect understanding.”

“No doubt,” replied Zorn, “and I fear that that understanding does not exist. Think of our confusion, if every detail, the choice of a base, the method of calculating, the position of the stations, the verification of the figures, opens

a fresh discussion every time ! Unless I am much mistaken I forbode a vast deal of quibbling when we come to compare our registers, and the observations we shall have made to the minutest fraction."

"You frighten me," said Emery. "It would be sorrowful to carry an enterprise of this kind so far, and then to fail for want of concord. Let us hope that your fears may not be realized."

"I hope they may not," answered the young Russian ; "but I say again, I assisted at certain scientific discussions on the voyage, which showed me that both Colonel Everest and his rival are undeniably obstinate, and that at heart there is a miserable jealousy between them."

"But these two gentlemen are never apart," observed Emery. "You never find one without the other ; they are as inseparable as ourselves."

"True," replied Zorn, "they are never apart all day long, but then they never exchange ten words : they only keep watch on each other. If one doesn't manage to annihilate the other, we shall indeed work under deplorable conditions."

"And for yourself," asked William, hesitatingly, "which of the two would you wish——"

"My dear William," replied Zorn with much frankness, "I shall loyally accept him as chief who can command respect as such. This is a question of science, and I have no prejudice in the matter. Matthew Strux and the Colonel

are both remarkable and worthy men : England and Russia should profit equally from their labours ; therefore it matters little whether the work is directed by an Englishman or a Russian. Are you not of my opinion ? ”

“ Quite,” answered Emery ; “ therefore do not let us be distracted by absurd prejudices, and let us as far as possible use our efforts for the common good. Perhaps it will be possible to ward off the blows of the two adversaries ; and besides there is your fellow countryman, Nicholas Palander——”

“ He ! ” laughed Zorn, “ he will neither see, hear, nor comprehend any thing ! He would make calculations to any extent ; but he is neither Russian, Prussian, English, or Chinese ; he is not even an inhabitant of this sublunary sphere ; he is Nicholas Palander, that’s all.”

“ I cannot say the same for my countryman, Sir John Murray,” said Emery. “ He is a thorough Englishman, and a most determined hunter, and he would sooner follow the traces of an elephant and giraffe than give himself any trouble about a scientific argument. We must therefore depend upon ourselves, Zorn, to neutralize the antipathy between our chiefs. Whatever happens, we must hold together.”

“ Ay, whatever happens,” replied Zorn, holding out his hand to his friend.

The bushman still continued to guide the caravan down

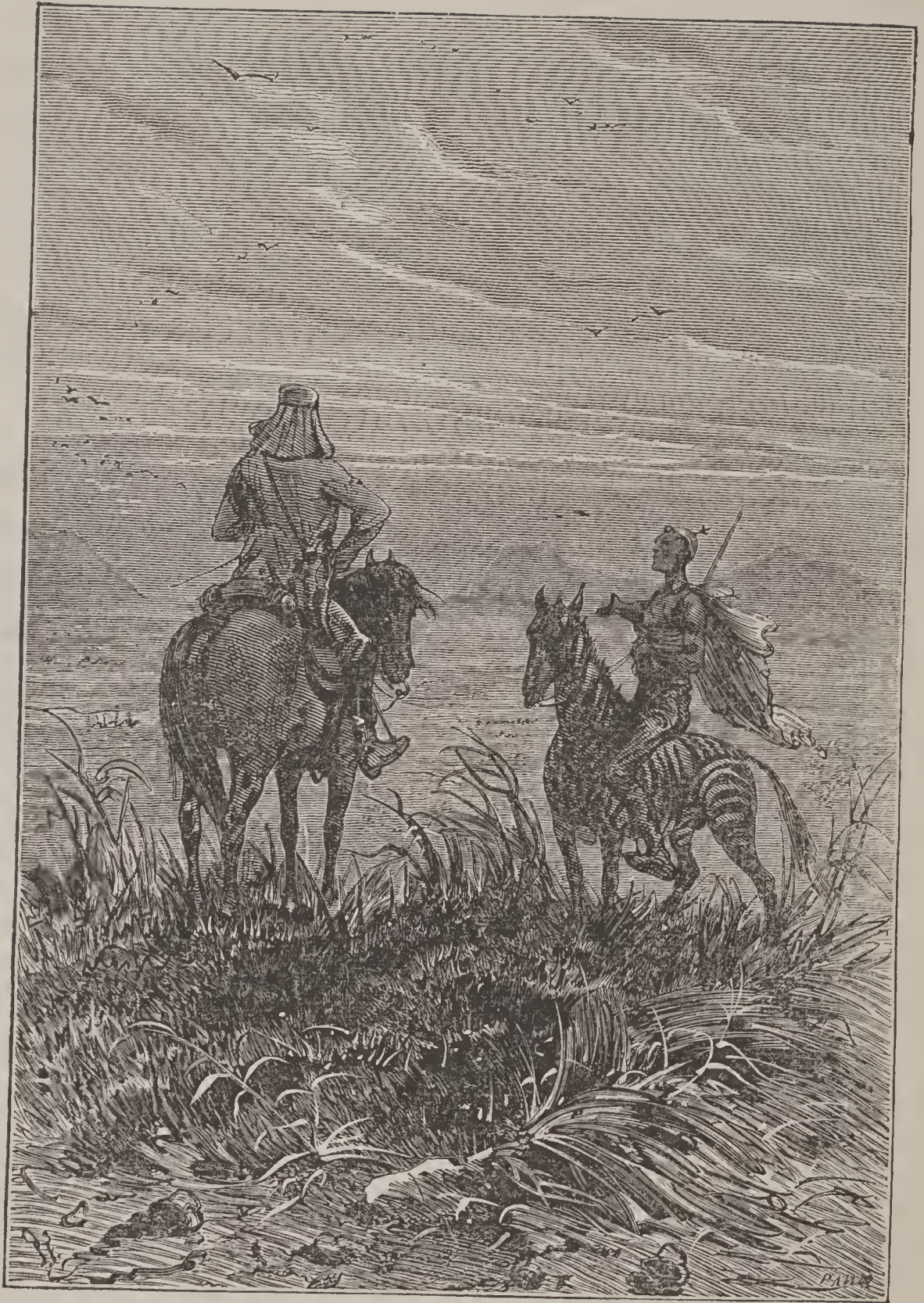
towards the south-west. At midday, on the 4th of March, it reached the base of the long wooded hills which extend from Lattakoo. Mokoum was not mistaken; he had led the expedition towards the plain, but it was still undulated, and therefore unfitted for an attempt at triangulation. The march continued uninterrupted, and Mokoum rode at the head of the riders and waggons, while Sir John Murray, Emery, and Zorn pushed on in advance. Towards the end of the day, they all arrived at a station occupied by one of the wandering "boers," or farmers, who are induced by the richness of the pasture-land to make temporary abodes in various parts of the country.

The colonist, a Dutchman, and head of a large family, received the Colonel and his companions most hospitably, and would take no remuneration in return. He was one of those brave, industrious men, whose slender capital, intelligently employed in the breeding of oxen, cows, and goats, soon produces a fortune. When the pasturage is exhausted, the farmer, like a patriarch of old, seeks for new springs and fertile prairies, pitching his camp afresh where the conditions seem favourable.

The farmer opportunely told Colonel Everest of a wide plain, fifteen miles away, which would be found quite flat. The caravan started next morning at daybreak. The only incident that broke the monotony of the long morning march, was Sir John Murray's taking a shot, at a distance

of more than 1000 yards, at a gnu, a curious animal about five feet high, with the muzzle of an ox, a long white tail, and pointed horns. It fell with a heavy groan, much to the astonishment of the bushman, who was surprised at seeing the animal struck at such a distance. The gnu generally affords a considerable quantity of excellent meat, and was accordingly in high esteem among the hunters of the caravan.

The site indicated by the farmer was reached about midday. It was a boundless prairie stretching to the north without the slightest undulation. No better spot for measuring a base could be imagined, and the bushman, after a short investigation, returned to Colonel Everest with the announcement that they had reached the place they were seeking.



The Bushman pointing to the Plain.—[Page 58.]

CHAPTER VII.

THE BASE OF THE TRIANGLE.

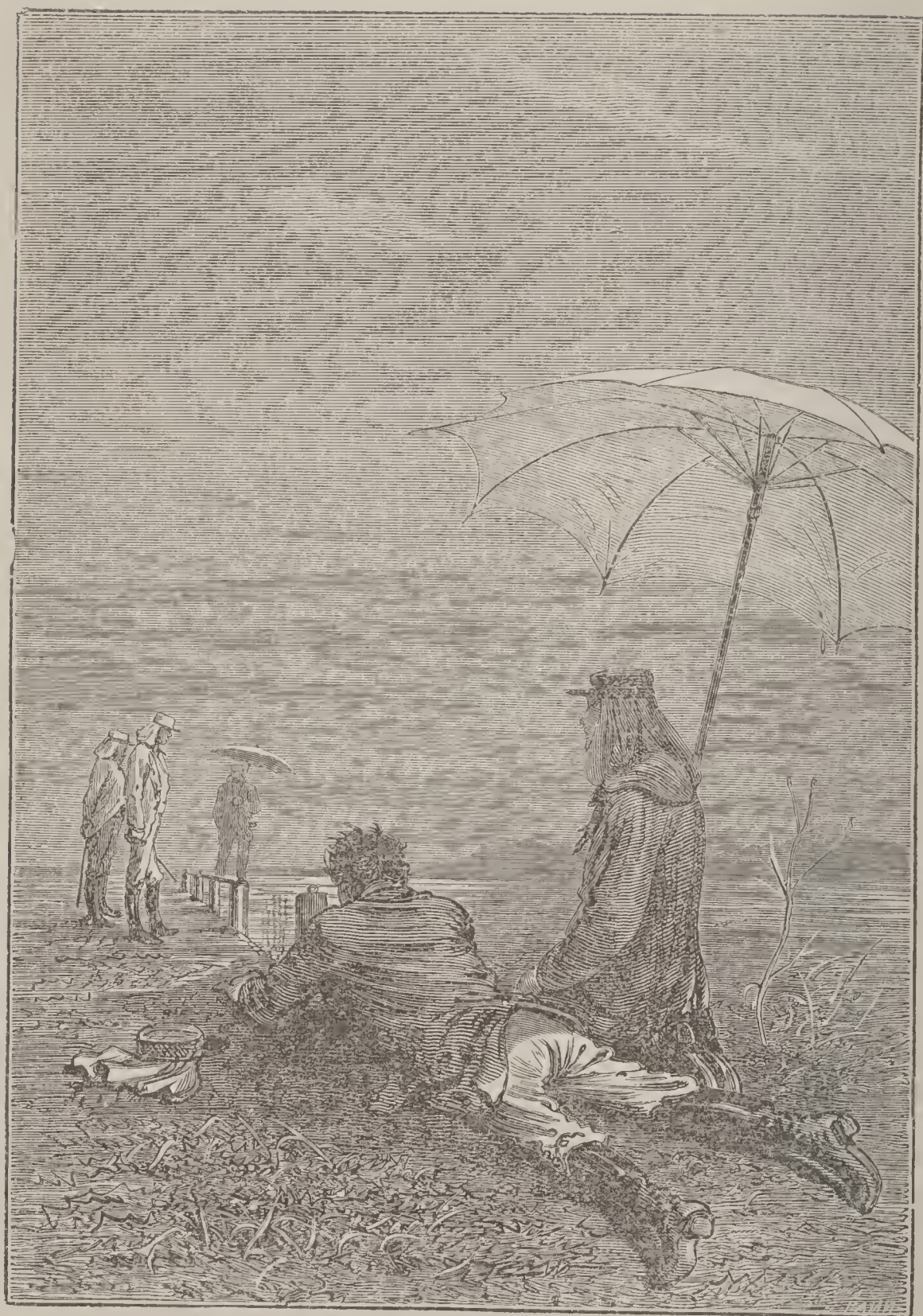
THE work undertaken by the Commission was a triangulation for the purpose of measuring an arc of meridian. Now the direct measurement of one or more degrees by means of metal rods would be impracticable. In no part of the world is there a region so vast and unbroken as to admit of so delicate an operation. Happily, there is an easier way of proceeding by dividing the region through which the meridian passes into a number of imaginary triangles, whose solution is comparatively easy.

These triangles are obtained by observing signals, either natural or artificial, such as church-towers, posts, or reverberatory lamps, by means of the theodolite or repeating-circle. Every signal is the vertex of a triangle, whose angles are exactly determined by the instruments, so that a good observer with a proper telescope can take the bearings of any object whatever, a tower by day, or a lamp by night. Sometimes the sides of the triangles are many miles in length, and when Arago connected the coast of

Valencia in Spain with the Balearic Islands, one of the sides measured 422,555 toises. When one side and two angles of any triangle are known, the other sides and angle may be found; by taking, therefore, a side of one of the known triangles for a new base, and by measuring the angles adjacent to the base, new triangles can be successively formed along the whole length of the arc; and since every straight line in the network of triangles is known, the length of the arc can be easily determined. The values of the sides and angles may be obtained by the theodolite and repeating circle, but the *first* side, the base of the whole system, must be actually measured on the ground, and this operation requires the utmost care.

When Delambre and Méchain measured the meridian of France from Dunkirk to Barcelona, they took for their base a straight line, 12,150 mètres in length, in the road from Melun to Lieusaint, and they were no less than 42 days in measuring it. Colonel Everest and Matthew Strux designed proceeding in the same way, and it will be seen how much precision was necessary.

The work was begun on the 5th of March, much to the astonishment of the Bochjesmen, who could not at all understand it. Mokoum thought it strange for these learned men to measure the earth with rods six feet long; but any way, he had done his duty; they had asked him for a level plain, and he had found it for them.



Commencement of the Geodesic Operations. — [Page 61.]

The place was certainly well chosen. Covered with dry, short grass, the plain was perfectly level as far as the horizon. Behind lay a line of hills forming the southern boundary of the Kalahari desert; towards the north the plain seemed boundless. To the east, the sides of the tableland of Lattakoo disappeared in gentle slopes; and in the west, where the ground was lower, the soil became marshy, as it imbibed the stagnant water which fed the affluents of the Kuruman.

"I think, Colonel Everest," said Strux, after he had surveyed the grassy level, "that when our base is established, we shall be able here also to fix the extremity of our meridian."

"Likely enough," replied the Colonel. "We must find out too, whether the arc meets with any obstacles that may impede the survey. Let us measure the base, and we will decide afterwards whether it will be better to join it by a series of auxiliary triangles to those which the arc must cross."

They thus resolved to proceed to the measurement of the base. It would be a long operation, for they wanted to obtain even more correct results than those obtained by the French philosophers at Melun. This would be a matter of some difficulty: since when a new base was measured afterwards near Perpignan to verify the calculations, there was only an error of 11 inches in a distance of 330,000 toises,

Orders were given for encamping, and a Bochjesman village, a kind of kraal, was formed on the plain. The waggons were arranged in a circle like the houses, the English and Russian flags floating over their respective quarters. The centre was common ground. The horses and buffaloes, which by day grazed outside, were driven in by night to the interior, to save them from attacks of the wild beasts around.

Mokoum took upon himself to arrange the hunting expedition for revictualling ; and Sir John Murray, whose presence was not indispensable in the measurement of the base, looked after the provisions, and served out the rations of preserved meat and fresh venison. Thanks to the skill and experience of Mokoum and his companions, game was never wanting. They scoured the district for miles round, and the report of their guns resounded at all hours.

The survey began on the next day, Zorn and Emery being charged with the preliminaries.

“Come along,” said Zorn, “and good luck be with us.”

The primary operation consisted in tracing a line on the ground where it was especially level. This chanced to be from S.E. to N.W., and pickets being placed at short intervals to mark the direction, Zorn carefully verified the correctness of their position by means of the thread-wires of his telescope. For more than eight miles (the proposed length of the base) was the measurement continued, and

the young men performed their work with scrupulous fidelity.

The next step was to adjust the rods for the actual measurement, apparently a very simple operation, but which, in fact, demands the most continuous caution, as the success of a triangulation in a great measure is contingent on its preciseness.

On the morning of the 10th, twelve wooden pedestals were planted along the line, securely fastened in their position, and prepared to support the rods. Colonel Everest and Matthew Strux, assisted by their young coadjutors, placed the rods in position, and Nicholas Palander stood ready, pencil in hand, to write down in a double register the figures transmitted to him.

The rods employed were six in number, and exactly two toises in length. They were made of platinum, as being (under ordinary circumstances) unaffected by any condition of the atmosphere. In order, however, to provide against any change of temperature, each was covered with a rod of copper somewhat shorter than itself, and a microscopic vernier was attached, to indicate any contraction or expansion that might occur. The rods were next placed lengthwise, with a small interval between each, in order to avoid the slight shock which might result from immediate contact. Colonel Everest and Matthew Strux with their own hands placed the first rod. About a hundred toises

farther on, they had marked a point of sight, and as the rods were each provided with iron projections, it was not difficult to place them exactly in the proper direction. Emery and Zorn, lying on the ground, saw that the projections stood exactly in the middle of the sight.

“Now,” said Colonel Everest, “we must define our exact starting-point. We will drop a line from the end of our first rod, and that will definitely mark the extremity of our base.”

“Yes,” answered Strux, “but we must take into account the radius of the line.

“Of course,” said the Colonel.

The starting-point determined, the work went on. The next proceeding was to determine the inclination of the base with the horizon.

“We do not, I believe, pretend,” said Colonel Everest, “to place the rod in a position which is perfectly horizontal.”

“No,” answered Strux, “it is enough to find the angle which each rod makes with the horizon, and we can then deduce the true inclination.”

Thus agreed, they proceeded with their observations, employing their spirit-level, and testing every result by the vernier. As Palander was about to inscribe the record, Strux requested that the level should be reversed, in order that by the division of the two registers a closer approximation to truth might be attained. This mode of double observation was continued throughout the operations.

Two important points were now obtained : the direction of the rod with regard to the base, and the angle which it made with the horizon. The results were inscribed in two registers, and signed by the members of the Commission.

There were still two further observations, no less important, to be made : the variation of the rod caused by differences of temperature, and the exact distance measured by it. The former was easily determined by comparing the difference in length between the platinum and copper rods. The microscope gave the variation of the platinum, and this was entered in the double register, to be afterwards reduced to 16° Centigrade.

They had now to observe the distance actually measured. To obtain this result, it was necessary to place the second rod at the end of the first, leaving a small space between them. When the second rod was adjusted with the same care as the former, it only remained to measure the interval between the two. A small tongue of platinum, known as a slider, was attached to the end of the platinum bar that was not covered by the copper, and this Colonel Everest slipped gently along until it touched the next rod. The slider was marked off into 10,000ths of a toise, and as a vernier with its microscope gave the 100,000ths, the space could be very accurately determined. The result was immediately registered.

Michael Zorn, considering that the covered platinum

might be sooner affected by heat than the uncovered copper, suggested another precaution: accordingly they erected a small awning to protect the rod from the sun's rays.

For more than a month were these minutiae patiently carried on. As soon as four bars were adjusted, and the requisite observations complete, the last of the rods was carried to the front. It was impossible to measure more than 220 to 230 toises a day, and sometimes, when the wind was violent, operations were altogether suspended.

Every evening, about three quarters of an hour before it became too dark to read the verniers, they left off work, after taking various anxious precautions. They brought forward temporarily the rod "No. 1," and marked the point of its termination. Here they made a hole, and drove in a stake with a leaden plate attached. They then replaced "No. 1" in its original position, after observing the inclination, the thermometric variation, and the direction. They noted the prolongation measured by rod "No. 4," and then with a plumb-line touching the foremost end of rod "No. 1," they made a mark on the leaden plate. They carefully traced through this point two lines at right angles, one signifying the base, the other the perpendicular. The plate was then covered with a wooden lid, the hole filled in, and the stake left buried till the morning. Thus, if any accident had happened to their apparatus during the night

they would not be obliged to begin afresh. The next day, the plate was uncovered, and rod "No. 1" replaced in the same position as on the evening before, by means of the plumb-line, whose point ought to fall exactly on the point intersected by the two straight lines.

These operations were carried on for thirty-eight days along the plain, and every figure was registered doubly, and verified, compared, and approved, by each member of the Commission.

Few discussions arose between Colonel Everest and his Russian colleague; and if sometimes the smallest fraction of a toise gave occasion for some polite cavillings, they always yielded to the opinion of the majority. One question alone called for the intervention of Sir John Murray. This was about the length of the base. It was certain that the longer the base, the easier would be the measurement of the opposite angle. Colonel Everest proposed 6000 toises, nearly the same as the base measured at Melun; but Matthew Strux wished that it should be 10,000 toises, since the ground permitted. Colonel Everest, however, remained firm, and Strux seemed equally determined not to yield. After a few plausible arguments, personalities began: they were no longer two astronomers, but an Englishman and a Russian. Happily the debate was interrupted by some days of bad weather, which allowed their tempers to cool. It was subsequently decided by the

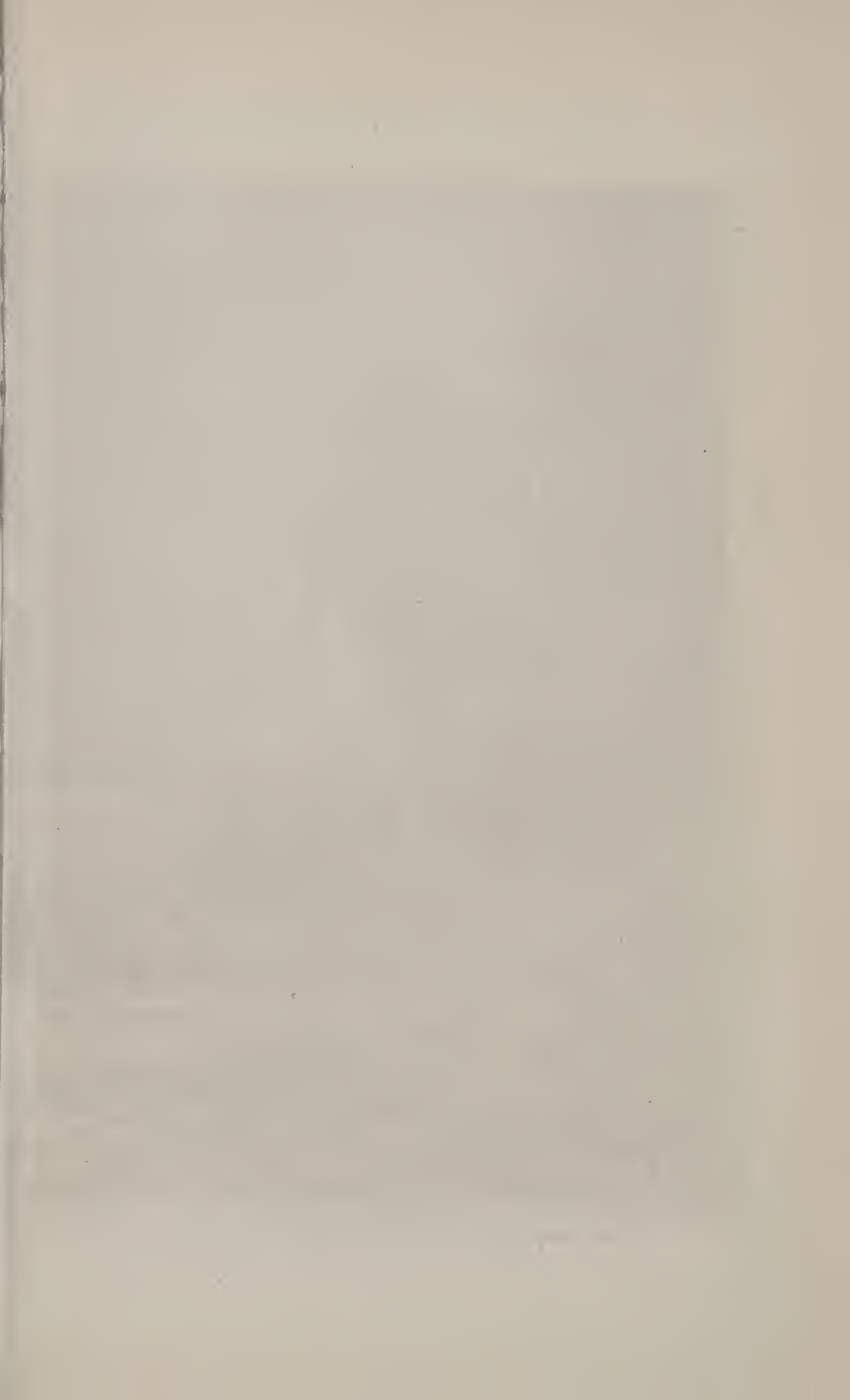
majority that they should "split the difference," and assign 8000 toises as the measurement of the base. The work was at length completed. Any error which occurred, in spite of their extreme precision, might be afterwards corrected by measuring a new base from the northern extremity of the meridian.

The base measured exactly 8037.75 toises, and upon this they were now to place their series of triangles.





Measuring the Arc of the Meridian.—[Page 69.]





Taking the Measurements.— [Page 69.]

CHAPTER VIII.

THE TWENTY-FOURTH MERIDIAN.

THE measurement of the base occupied thirty-eight days, from the 6th of March to the 13th of April, and without loss of time the chiefs decided to begin the triangles. The first operation was to find the southern extremity of the arc, and the same being done at the northern extremity, the difference would give the number of degrees measured.

On the 14th they began to find their latitude. Emery and Zorn had already on the preceding nights taken the altitude of numerous stars, and their work was so accurate that the greatest error was not more than 2", and even this was probably owing to the refraction caused by the changes in the atmospheric strata. The latitude thus carefully sought was found to be 27.951789° . They then found the longitude, and marked the spot on an excellent large scale map of South Africa, which showed the most recent geographical discoveries, and also the routes of travellers and naturalists, such as Livingstone, Anderson, Magyar, Baldwin,

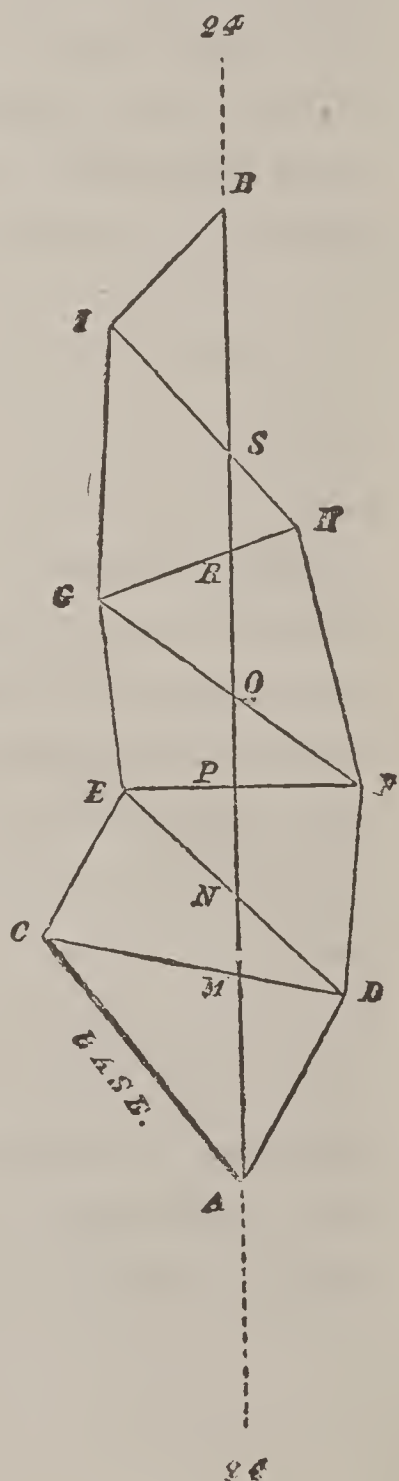
Burchell, and Lichtenstein. They then had to choose on what meridian they would measure their arc. The longer this arc is the less influence have the errors in the determination of latitude. The arc from Dunkirk to Formentera, on the meridian of Paris, was exactly $9^{\circ} 56'$. They had to choose their meridian with great circumspection. Any natural obstacles, such as mountains or large tracts of water, would seriously impede their operations; but happily, this part of Africa seemed well suited to their purpose, since the risings in the ground were inconsiderable, and the few watercourses easily traversed. Only dangers, and not obstacles, need check their labours.

This district is occupied by the Kalahari desert, a vast region extending from the Orange River to Lake Ngami, from lat. 20° S. to lat. 29° . In width, it extends from the Atlantic on the west as far as long. 25° E. Dr. Livingstone followed its extreme eastern boundary when he travelled as far as Lake Ngami and the Zambesi Falls. Properly speaking, it does not deserve the name of desert. It is not like the sands of Sahara, which are devoid of vegetation, and almost impassable on account of their aridity. The Kalahari produces many plants; its soil is covered with abundant grass; it contains dense groves and forests; animals abound, wild game and beasts of prey; and it is inhabited and traversed by sedentary and wandering tribes of Bushmen and Bakalaharis. But the true obstacle to its

exploration is the dearth of water which prevails through the greater part of the year, when the rivers are dried up. However, at this time, just at the end of the rainy season, they could depend upon considerable reservoirs of stagnant water, preserved in pools and rivulets. Such were the particulars given by Mokoum. He had often visited the Kalahari, sometimes on his own account as a hunter, and sometimes as a guide to some geographical exploration.

It had now to be actually considered whether the meridian should be taken from one of the extremities of the base, thus avoiding a series of auxiliary triangles¹.

¹ By the aid of the accompanying figure, the work called a triangulation may be understood. Let AB be the arc. Measure the base AC very carefully from the extremity A to the first station C . Take other stations, D, E, F, G, H, I , &c., on alternate sides of the meridian, and observe the angles of the triangles, ACD, CDE, DEF, EFG , &c. Then in the triangle ACD , the angles and the side AC being known, the side CD may be found. Likewise in the triangle CDE , CD and the angles being known, the side DE may be found; and so on through all the triangles. Now determine the direction of the meridian in the ordinary way, and observe the angle MAC which it makes with the base AC .



After some discussion, it was decided that the southern extremity of the base would serve for a starting-point. It was the twenty-fourth meridian east from Greenwich, and extended over seven degrees of latitude, from 20° to 27° , without any apparent natural obstacle. Towards the north it certainly crossed the eastern end of Lake Ngami, but Arago had met with greater difficulties than this when he applied his geodesy to connect the coast of Spain with the Balearic Islands. It was accordingly decided that meridian 24° should be measured, since, if it were afterwards prolonged into Europe, a northern arc of the same meridian might be measured on Russian territory.

The astronomers proceeded at once to choose a station which should form the vertex of the first triangle. This was a solitary tree to the right of the meridian, standing on a mound about ten miles away. It was distinctly visible from each extremity of the base, and its slender top facilitated the taking of its bearings. The angle made by the tree with the south-east extremity of the base was first

Then in the triangle $A C M$, because $A C$ and the adjacent angles are known, $A M$, $C M$, and the angle $A C M$, may be found, and $A M$ is the first portion of the arc. Then in the triangle $D M N$, since the side $D M = C D - C M$, and the adjacent angles are known, the sides $M N$, $D N$, and the angle $M N D$ may be found, and $M N$ is the next portion of the arc. Again, in the triangle $N E P$, because $E N = D E - D N$, and the adjacent angles are known, $N P$, the third portion of the arc, may be found. By proceeding thus through all the triangles, piece by piece, the whole length of the arc $A B$ may be determined.



The Astronomers at Work. — [Page 72.]

observed, with the help of one of Borda's repeating circles.

The two telescopes were adjusted so that their axes were exactly in the plane of the circle, in such a way that their position represented the angular distance between the tree and the north-west extremity of the base. This admirably-constructed instrument corrects nearly all the errors of observation, and indeed, if the repetitions are numerous, the errors tend to counterbalance and correct each other.

The Commission had four repeating circles: two for measuring angles, and two more with vertical circles for obtaining zenith distances, and so calculating in a single night, to the smallest fraction of a second, the latitude of any station. And indeed, in this important survey, it was not only necessary to obtain the value of the angles of the triangles, but also to measure the meridian altitude of the stars, that being equal to the latitude of each station.

The work began on the 14th of April. Colonel Everest, Zorn, and Palander observed the angle at the south-east extremity of the base, while Strux, Emery, and Sir John Murray observed that at the north-west extremity.

Meantime the camp was raised, and the bullocks harnessed, and Mokoum conducted the caravan to the first station as a halting-place. Two caravans, with their drivers, accompanied the observers, to carry the instruments. The weather was bright, but had the atmosphere been unfavour-

able by day, the observations would have been made by night by means of reverberators or electric lamps.

On the first day, the two angles were measured, and the result inscribed on the double register ; and the astronomers all met in the evening at the camp which had been formed round the tree which had served for their point of sight. It was an immense baobab, more than 80 feet in circumference. Its syenite-coloured bark gave it a peculiar appearance. The whole caravan found room beneath its wide branches, which were inhabited by crowds of squirrels, which greedily devoured the white pulp of its egg-shaped fruit.

Supper was prepared for the Europeans by the ship's cook. There was no lack of venison, for the hunters had scoured the neighbourhood, and killed some antelopes ; and soon the air was filled with an odour of broiled meat, which still further aroused the appetite of the hungry savants.

After the comforting repast, the astronomers retired to their respective waggons, whilst Mokoum placed sentinels round the camp. Large fires of the dead branches of the baobab burnt throughout the night, and kept at a respectful distance the tawny beasts, who were attracted by the odour of the reeking flesh.

After two hours' sleep, however, Emery and Zorn got up, their observations not yet finished. They must find the altitudes of some stars to determine the latitude of the



Encampment under an immense Baobab.—[Page 74.]

station, and both, regardless of the day's fatigues, stood at their telescopes, and rigorously determined the change of zenith caused by the removal from the first station to the second, while the laugh of the hyena and the roar of the lion resounded over the sombre plain.

CHAPTER IX.

THE KRAAL.

THE next day operations were continued. The angle made by the baobab with the extremities of the base was measured, and the first triangle solved. Two more stations were chosen to the right and left of the meridian ; one formed by a distinct mound, six miles away ; the other, marked out by a post about seven miles distant.

The triangulation went on uninterruptedly for a month, and by the 15th of May the observers had advanced northwards 1° , having formed seven triangles. During this first series of operations, the Colonel and Strux were rarely together. The division of labour separated them, and the circumstance of their daily work being several miles apart was a guarantee against any dispute. Each evening they returned to their several abodes, and although at intervals discussions arose about the choice of stations, there was no serious altercation. Hence Zorn and his friend were in hopes that the survey would proceed without any open rupture.

After advancing 1° from the south, the observers found themselves in the same parallel with Lattakoo, from which they were distant 35 miles to the west.

Here a large kraal had lately been formed, and as it was a marked halting-place, Sir John Murray proposed that they should stay for several days. Zorn and Emery could take advantage of the rest, to take the altitude of the sun; and Palander would employ himself in reducing the measurements made at different points of sight to the uniform level of the sea. Sir John himself wanted to be free from scientific observations, that he might divert himself with his gun among the fauna of the country. A kraal, as it is termed by the natives of South Africa, is a kind of moving village, wandering from one pasturage to another. It is an enclosure composed ordinarily of about thirty habitations, and containing several hundred inhabitants. The kraal now reached was formed by a group of more than sixty huts, enclosed for protection from wild animals by a palisade of prickly aloes, and situated on the banks of a small affluent of the Kuruman. The huts, made of water-proof rush mats fastened to wooden beams, were like low hives. The doorway, protected by a skin, was so small that it could only be entered on hands and knees, and from this, the only aperture, issued such dense wreaths of smoke as would make existence in these abodes problematical to any but a Bochjesman or a Hottentot.

The whole population was roused by the arrival of the caravan. The dogs, of which there was one for the protection of each cabin, barked furiously, and about 200 warriors, armed with assagais, knives, and clubs, and protected by their leathern shields, marched forward.

A few words from Mokoum to one of the chiefs soon dispelled all hostile feeling, and the caravan obtained permission to encamp on the very banks of the stream. The Bochjesmen did not even refuse to share the pastures, which extended for miles away.

Mokoum having first given orders for the waggons to be placed in a circle as usual, mounted his zebra, and set off in company with Sir John Murray, who rode his accustomed horse. The hunters took their dogs and rifles, showing their intention of attacking the wild beasts, and went towards the woods.

“I hope, Mokoum,” said Sir John, “that you are going to keep the promise you made at the Morgheda Falls, that you would bring me into the best sporting country in the world. But understand, I have not come here for hares or foxes ; I can get them at home. Before another hour——”

“Hour !” replied the bushman. “You are rather too fast. A little patience, please. For myself, I am never patient except when hunting, and then I make amends for all my impatience at other times. Don’t you know, Sir John, that the chase of large beasts is quite a science.

Here you must wait and watch. You must not step or even look too quickly. For my part, I have laid in wait for days together for a buffalo or gemsbok, and if I have had success at last, I have not considered my trouble in vain."

"Very good," replied Sir John, "I can show you as much patience as you can wish; but mind, the halt only lasts for three or four days, and we must lose no time."

"There is something in that," said the bushman, so calmly that Emery would not have recognized his companion of the Orange River; "we will just kill that which comes first, Sir John, antelope or deer, gnu or gazelle, any thing must do for hunters in a hurry."

"Antelope or gazelle!" cried Sir John, "why, what more could I ask, my good fellow?"

"As long as your honour is satisfied I have nothing more to say," said the bushman, somewhat ironically. "I thought that you would not let me off with any thing less than a rhinoceros or two, or at least an elephant."

"Any thing and any where," said Sir John, "we only waste time in talking."

The horses were put to a hand-gallop, and the hunters advanced quickly towards the forest. The plain rose with a gentle slope towards the north-east. It was dotted here and there with shrubs in full bloom, from which issued a viscous resin, transparent and odorous, of which the colonists

make a balm for wounds. In picturesque groups rose the "nwanas," a kind of sycamore fig, whose trunks, leafless to the height of 30 or 40 feet, supported a spreading parasol of verdure. Among the foliage chattered swarms of screaming parrots, eagerly pecking the sour figs. Farther on were mimosas with their yellow clusters, "silver trees," shaking their silky tufts, and aloes with spikes so red that they might pass for coral plants torn from the depths of the sea. The ground, enamelled with amaryllis with their bluish foliage, was smooth and easy for the horses, and in less than an hour after leaving the kraal, the sportsmen reached the wood. For several miles extended a forest of acacias, the entangled branches scarcely allowing a ray of sunlight to penetrate to the ground below, which was encumbered by brambles and long grass.

The hunters had little difficulty, however, in urging on both horse and zebra, in spite of every obstacle, resting at the recurring glades to examine the thickets around them. The first day was not very favourable. In vain was the forest scoured ; not a single beast stirred, and Sir John's thoughts turned more than once to the plains of Scotland, where a shot is rarely long delayed. Mokoum evinced neither surprise nor vexation ; to him it was not a hunt, but merely a rush across the forest.

Towards six in the evening they had to think about returning. Sir John was more vexed than he would allow



The Hunters. — [Page So.]

Rather than that he, the renowned hunter, should return empty-handed, he resolved to shoot whatever first came within range, and fortune seemed to favour him.

They were not more than three miles from the kraal when a hare (of the species called "*lepus rupestris*") darted from a bush about 150 paces in front of them. Sir John did not hesitate a moment, and sent his explosive ball after the poor little animal.

The bushman gave a cry of indignation at such a ball being employed for such an aim; but the Englishman, eager for his prey, galloped to the spot where the victim fell. In vain! the only vestiges of the hare were the bloody morsels on the ground. Whilst the dogs rummaged in the brushwood, Sir John looked keenly about, and cried,—

"I am sure I hit it!"

"Rather too well," replied the bushman quietly.

And sure enough, the hare had been blown into countless fragments.

Sir John, greatly mortified, remounted his horse, and returned to camp, without uttering another word.

The next day the bushman waited for Sir John Murray to propose another expedition; but the Englishman applied himself for a time to his scientific instruments. For pastime he watched the occupants of the kraal as they practised with their bows, or played on the "gorah," an instrument composed of a piece of catgut stretched on a bow, and kept

in vibration by blowing through an ostrich feather. He remarked that the women, while occupied in their domestic duties, smoked "matokouané," that is, the unwholesome hemp-plant, a practice indulged in by most of the natives. According to some travellers, this inhaling of hemp increases physical strength to the damage of mental energy ; and, indeed, many of the Bochjesmen appeared stupefied from its effects.

At dawn, however, the following day, Sir John Murray was aroused by the appearance of Mokoum, who said, "I think, sir, we may be fortunate enough to-day to find something better than a hare."

Sir John, not heeding the satire, declared himself ready ; and the two hunters, accordingly, were off betimes. This time, Sir John, instead of his formidable rifle, carried a simple gun of Goldwin's, as being a more suitable weapon. True, there was a chance of meeting some prowling beast from the forest ; but he had the hare on his mind, and would sooner use small shot against a lion than repeat an incident unprecedented in the annals of sport.

Fortune, to-day, was more favourable to the hunters. They brought down a couple of harrisbucks, a rare kind of black antelope, very difficult to shoot. These were charming animals, four feet high, with long diverging horns shaped like scimitars. The tips of their noses were narrow ; they had black hoofs, close soft hair, and pointed ears. Their

face and belly, white as snow, contrasted well with their black back, over which fell a wavy mane. Hunters may well be proud of such shots, for the harrisbuck has always been the *desideratum* of the Delegorgues, Vahlbergs, Cummings, and Baldwins, and it is one of the finest specimens of the southern fauna.

But what made the Englishman's heart beat fastest, was Mokoum's showing him certain marks on the edge of the thick underwood, not far from a deep pool, surrounded by giant cuphorbias, and whose surface was dotted with sky-blue water-lilies.

"Come and lie in ambush here to-morrow, sir," said Mokoum, "and this time you may bring your rifle. Look at these fresh footprints."

"What are they? Can they be an elephant's?" asked Sir John.

"Yes," replied Mokoum, "and, unless I am mistaken, of a male full-grown."

Eagerly, then, was the engagement made for the following day. Sir John's horse, as they returned, carried the harrisbucks. These fine creatures, so rarely captured, excited the admiration of the whole caravan, and all congratulated Sir John, except perhaps Matthew Strux, who knew little of animals, except the Great Bear, the Centaur, Pegasus, and other celestial fauna.

At four o'clock the next morning, the hunters, attended

by their dogs, were already hidden in the underwood. They had discovered by new footmarks that the elephants came in a troop to drink at the pool. Their grooved rifles carried explosive bullets. Silent and still, they watched for about half-an-hour, when they observed a movement in the grove, about fifty paces from the pool. Sir John seized his gun, but the bushman made him a sign to restrain his impatience. Soon large shadows appeared : the thickets rustled under the violence of some pressure ; the brushwood snapped and crackled, and the sound of a loud breathing was perceptible through the branches. It was the herd of elephants. Half-a-dozen gigantic creatures, almost as large as those of India, advanced slowly towards the pool. The increasing daylight allowed Sir John, struck with admiration, to notice especially a male of enormous size. His colossal proportions appeared in the partial light even greater than they really were. While his trunk was extended above the underwood, with his curved tusks he struck the great stems, which groaned under the shock. The bushman leant down close to Sir John's ear, and whispered,—

“ Will he suit you ? ”

Sir John made a sign of affirmation.

“ Then,” said Mokoum, “ we will separate him from the rest.”

At this instant, the elephants reached the edge of the pool, and their spongy feet sank into the soft mud. They

pumped up the water with their trunks, and poured it into their throats with a loud gurgling. The great male looked uneasily about him, and seemed to scent some approaching danger.

Suddenly the bushman gave a peculiar cry. The dogs, barking furiously, darted from concealment, and rushed towards the herd. At the same moment, Mokoum, charging his companion to remain where he was, went off on his zebra to intercept the elephant's retreat. The animal made no attempt to take flight, and Sir John, with his finger on the lock of his rifle, watched him closely. The brute beat the trees, and lashed his tail furiously, showing signs not of uneasiness, but of anger. Now, for the first time, catching sight of his enemy, he rushed upon him at once.

Sir John was about sixty paces distant ; and waiting till the elephant came within forty paces, he aimed at his flank and fired. But a movement of the horse made his aim unsteady, and the ball only entered the soft flesh without meeting any obstacle sufficient to make it explode.

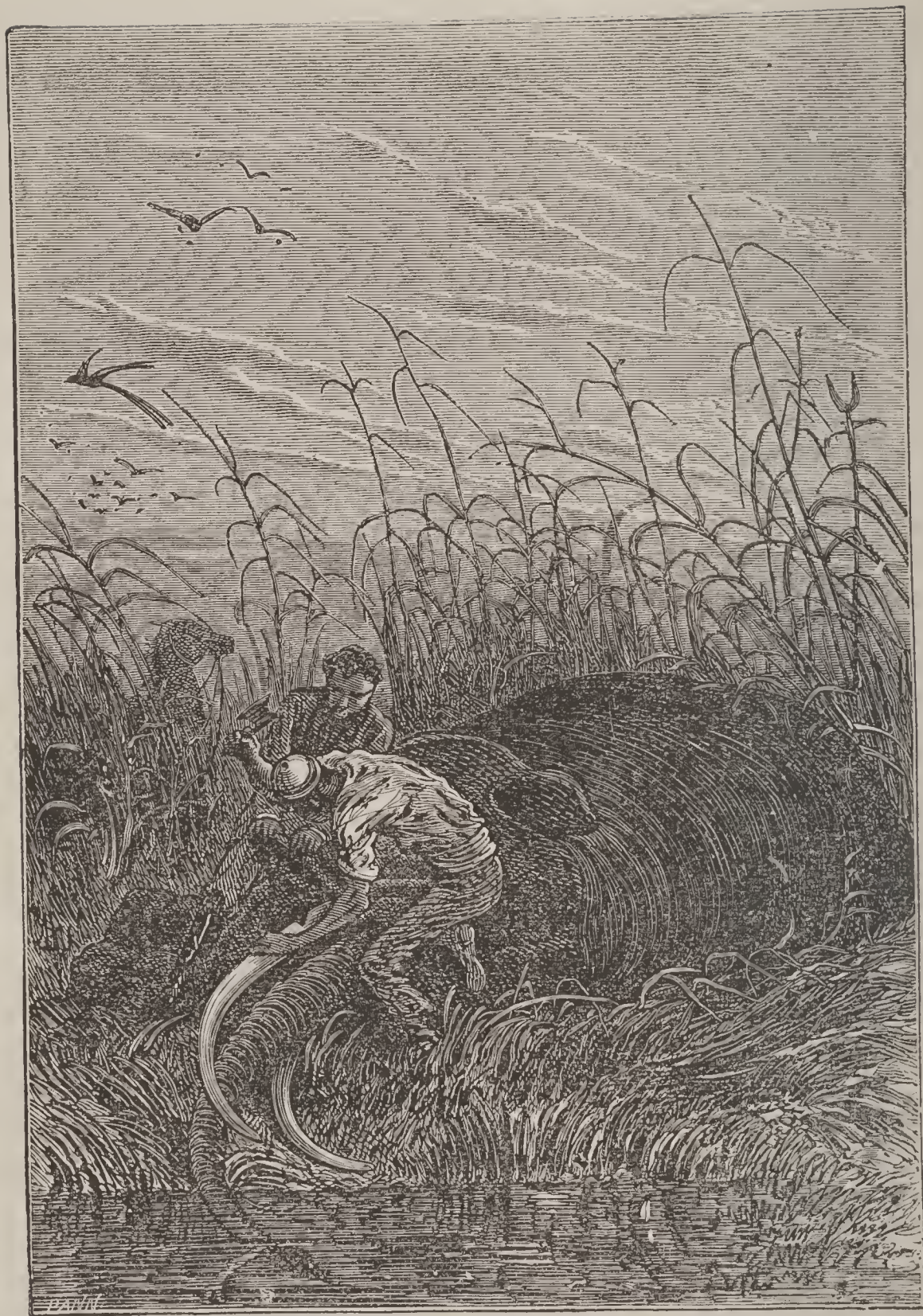
The enraged beast increased its pace, which was rather a rapid walk than a run, and would have soon distanced the horse. Sir John's horse reared, and rushed from the thicket, his master unable to hold him in. The elephant followed, ears erect, and bellowing like a trumpet. Sir John, thus carried away, held on to his horse tightly with his knees, and endeavoured to slip a cartridge into the chamber of his

rifle. Still the elephant gained on him. They were soon beyond the wood, and out on the plain. Sir John vigorously used his spurs, and the two dogs rushed panting in the rear. The elephant was not two lengths behind. Sir John could hear the hissing of his trunk, and almost feel his strong breath. Every moment he expected to be dragged from his saddle by the living lasso. All at once the horse sunk on his hind-quarters, struck by the elephant on his haunches. He neighed, and sprung to one side, thus saving Sir John. The elephant, unable to check his course, passed on, and sweeping the ground with his trunk, caught up one of the dogs, and shook it in the air with tremendous violence. No resource remained except to re-enter the wood, and the horse's instinct carried him thither. The elephant continued to give chase, brandishing the unlucky dog, whose head he smashed against a sycamore as he rushed into the forest. The horse darted into a dense thicket entangled with prickly creepers, and stopped.

Sir John, torn and bleeding, but not for an instant discomposed, turned round, and shouldering his rifle, took aim at the elephant close to the shoulder, through the net-work of creepers. The ball exploded as it struck the bone. The animal staggered, and almost at the same moment a second shot from the edge of the wood struck his left flank. He fell on his knees near a little pool, half-hidden in the grass. There, pumping up the water with his



The Elephant and the Dog.--[Page 86.]



“He is ours! he is ours!”—[Page 87]

trunk, he began to wash his wounds, uttering plaintive cries. The bushman now appeared, shouting, "He is ours, he is ours!"

And in truth the animal was mortally wounded. He groaned piteously, and breathed hard. His tail moved feebly, and his trunk, fed from the pool of his blood, poured back a crimson stream on the surrounding brushwood. Gradually failed his strength, and the great beast was dead.

Sir John Murray now emerged from the grove. He was half naked, little of his hunting costume remaining but rags. But he felt as though he could have given his very skin for this triumph.

"A glorious fellow!" he exclaimed, as he examined the carcase; "but rather too big to carry home."

"True, sir," answered Mokoum; "we will cut him up on the spot, and carry off the choice parts. Look at his magnificent tusks! Twenty-five pounds a-piece at least! And ivory at five shillings a-pound will mount up."

Thus talking, the hunter proceeded to cut up the animal. He took off the tusks with his hatchet, and contented himself with the feet and trunk, as choice morsels with which to regale the members of the Commission. This operation took some time, and he and his companion did not get back to camp before midday. The bushman had the elephant's feet cooked according to the African method,

that is, by burying them in a hole previously heated, like an oven, with hot coals.

The delicacy was fully appreciated by all, not excepting the phlegmatic Palander, and Sir John Murray received a hearty round of compliments.

CHAPTER X.

THE RAPID.

DURING their sojourn by the kraal, Colonel Everest and Matthew Strux had been absolutely strangers. On the eve of their departure for their divided labours, they had ceremoniously taken leave one of the other, and had not since met. The caravan continued its northward route, and the weather being favourable, during the next ten days two fresh triangles were measured. The vast verdant wilderness was intersected by streams flowing between rows of the willow-like "karree-hout," from which the Bochjesmen make their bows. Large tracts of desert land occurred, where every trace of moisture disappeared, leaving the soil utterly bare but for the cropping-up occasionally of those mucilaginous plants which no aridity can kill. For miles there was no natural object that could be used for a station, and consequently the astronomers were obliged to employ natural objects for their point of sight. This caused considerable loss of time, but was not attended with much real

difficulty. The crew of the "Queen and Czar" were employed in this part of the work, and performed their task well and rapidly ; but the same jealousy that divided their chiefs crept in sometimes among the seamen. Zorn and Emery did all they could to neutralize any unpleasantness, but the discussions sometimes took a serious character. The Colonel and Strux continually interfered in behalf of their countrymen, whether they were right or wrong, but they only succeeded in making matters worse. After a while Zorn and Emery were the only members of the party who had preserved a perfect concord. Even Sir John Murray and Nicholas Palander (generally absorbed as they were, the one in his calculations, the other in his hunting), began to join the fray.

One day the dispute went so far that Strux said to the Colonel, "You must please to moderate your tone with astronomers from Poulkowa : remember it was their telescope that showed that the disc of Uranus is circular."

"Yes," replied the Colonel ; "but ours at Cambridge enabled us to classify the nebula of Andromeda."

The irritation was evident, and at times seemed to imperil the fate of the triangulation. Hitherto the discussions had had no injurious effect, but perhaps rather served to keep every operation more scrupulously exact.

On the 30th the weather suddenly changed. In any other region a storm and torrents of rain might have been

expected: angry-looking clouds covered the sky, and lightning, unaccompanied by thunder, gleamed through the mass of vapour. But condensation did not ensue—not a drop of rain fell on to the thirsty soil. The sky remained overcast for some days, and the fog rendered the points of sight invisible at the distance of a mile. The astronomers, however, would not lose time, and determined to set up lighted signals and work at night. The bushman prudently advised caution, lest the electric lights should attract the wild beasts too closely to their quarters; and in fact, during the night, the yelp of the jackal and the hoarse laugh of the hyena, like that of a drunken negro, could plainly be heard.

In the midst of this clamour, in which the roar of a lion could sometimes be distinguished, the astronomers felt rather distracted, and the measurements were taken at least less rapidly, if not less accurately. To take zenith distances while gleaming eyes might be gazing at them through the darkness, required imperturbable composure and the utmost *sang-froid*. But these qualities were not wanting in the members of the Commission, and after a few days they regained their presence of mind, and worked away in the midst of the beasts as calmly as if they were in their own observatories. Armed hunters attended them at every station, and no inconsiderable number of hyenas fell by their balls. Sir John thought this way of surveying delightful, and whilst

his eye was at his telescope his hand was on his gun, and more than once he made a shot in the interval between two observations.

Nothing occurred to check the steady progress of the survey, so that the astronomers hoped before the end of June to measure a second degree of the meridian. On the 17th they found that their path was crossed by an affluent of the Kuruman. The Europeans could easily take their instruments across in their india-rubber canoe ; but Mokoum would have to take the caravan to a ford which he remembered some miles below. The river was about half-a-mile wide, and its rapid current, broken here and there by rocks and stems of trees embedded in the mud, offered considerable danger to any light craft. Matthew Strux did not fail to represent this, but finding that his companions did not recoil from the attempt he gave way.

Nicholas Palander alone was to accompany the caravan in its *détour*. He was too much absorbed in his calculations to give any thought to danger ; but his presence was not indispensable to his companions, and the boat would only hold a limited number of passengers. Accordingly, he gave up his place to an Englishman of the crew of the "Queen and Czar," who would be more useful under the circumstances.

After making an arrangement to meet to the north of the rapid, the caravan disappeared down the left bank of the

stream, leaving Colonel Everest, Strux, Emery, Zorn, Sir John, two sailors, and a Bochjesman, who was the pioneer of the caravan, and had been recommended by Mokoum as having much experience in African rapids.

"A pretty river," observed Zorn to his friend, as the sailors were preparing the boat.

"Very so, but hard to cross," answered Emery. "These rapids have not long to live, and therefore enjoy life. With a few weeks of this dry season there will hardly remain enough of this swollen torrent to water a caravan. It is soon exhausted; such is the law of nature, moral and physical. But we must not waste time in moralizing. See, the boat is equipped, and I am all anxiety to see her performances."

In a few minutes the boat was launched beside a sloping bank of red granite. Here, sheltered by a projecting rock, the water quietly bathed the reeds and creepers. The instruments and provisions were put in the boat, and the passengers seated themselves so as not to interfere with the action of the oars. The Bochjesman took the helm; he spoke but a few words of English, and advised the travellers to keep a profound silence while they were crossing. The boat soon felt the influence of the current. The sailors carefully obeyed every order of the Bochjesman. Sometimes they had to raise their oars to avoid some half-emerged stump; sometimes to row hard across a whirlpool.

When the current became too strong they could only guide the light boat as it drifted with the stream. The native, tiller in hand, sat watchful and motionless, prepared for every danger. The Europeans were half uneasy at their novel situation ; they seemed carried away by an irresistible force. The Colonel and Strux gazed at each other without a word ; Sir John, with his rifle between his knees, watched the numerous birds that skimmed the water ; and the two younger astronomers gazed with admiration at the banks, past which they flew with dizzy speed. The light boat soon reached the true rapid, which it was necessary to cross obliquely. At a word from the Bochjesman, the sailors put forth their strength ; but, despite all their efforts, they were carried down parallel to the banks. The tiller and oars had no longer any effect, and the situation became really perilous ; a rock or stump of a tree would inevitably have overturned the boat. In spite of the manifest peril, no one uttered a word. The Bochjesman half rose, and watched the direction which he could not control. Two hundred yards distant rose an islet of stones and trees, which it was impossible to avoid. In a few seconds the boat apparently must be lost ; but the shock came with less violence than had seemed inevitable. The boat lurched and shipped a little water, but the passengers kept their places. They were astonished to observe that what they had presumed to be rock had moved, and was plunging



The Hippopotamus did not quit his hold, but shook the Boat as a Dog would a Hare.—[Page 95.]

about in the rush of the waters. It was an immense hippopotamus, ten feet long, which had been carried by the current against the islet, and dared not venture out again into the rapid. Feeling the shock, he raised and shook his head, looking about him with his little dull eyes, and with his mouth wide open, showing his great canine teeth. He rushed furiously on the boat, which he threatened to bite to pieces.

But Sir John Murray's presence of mind did not forsake him. Quietly shouldering his rifle, he fired at the animal near the ear. The hippopotamus did not quit his hold, but shook the boat as a dog would a hare. A second shot was soon lodged in his head. The blow was mortal. After pushing the boat with a last effort off the islet, the fleshy mass sank in the deep water. Before the dismayed voyagers could collect their thoughts, they were whirled obliquely into the rapid. A hundred yards below, a sharp bend in the river broke the current; thither was the boat carried, and was arrested by a violent shock. Safe and sound the whole party leapt to the bank. They were about two miles below the spot where they had embarked.

CHAPTER XI.

A MISSING COMPANION.

IN continuing the survey the astronomers had to be on their guard against the serpents that infested the region, venomous mambas, ten to twelve feet long, whose bite would have been fatal.

Four days after the passage of the rapid, the observers found themselves in a wooded country. The trees, however, were not so high as to interfere with their labours, and at all points rose eminences which afforded excellent sites for the posts and electric lamps. The district, lying considerably lower than the rest of the plain, was moist and fertile. Emery noticed thousands of Hottentot fig-trees, whose sour fruit is much relished by the Bochjesmen. From the ground arose a soft odour from the "kucumakranti," a yellow fruit two or three inches long, growing from bulbous roots like the colchicum, and eagerly devoured by the native children. Here, too, in this more watered country, reappeared the fields of colocynths and borders of the mint

so successfully naturalized in England. Notwithstanding its fertility, the country appeared little frequented by the wandering tribes, and not a kraal or a camp-fire was to be seen ; yet water was abundant, forming some considerable streams and lagoons.

The astronomers halted to await the caravan. The time fixed by Mokoum had just expired, and if he had reckoned well, he would join them to-day. The day, however, passed on, and no Bochjesman appeared. Sir John conjectured that the hunter had probably been obliged to ford farther south than he had expected, since the river was unusually swollen. Another day passed and the caravan had not appeared. The Colonel became uneasy ; he could not go on, and the delay might affect the success of the operations. Matthew Strux said that it had always been his wish to accompany the caravan, and that if his advice had been followed they would not have found themselves in this predicament ; but he would not admit that the responsibility rested on the Russians. Colonel Everest began to protest against these insinuations, but Sir John interposed, saying that what was done could not be undone, and that all the recriminations in the world would make no difference.

It was then decided that if the caravan did not appear on the following day, Emery and Zorn, under the guidance of the Bochjesman, should start to ascertain the reason of the

delay. For the rest of the day the rivals kept apart, and Sir John passed his time in beating the surrounding woods. He failed in finding any game, but from a naturalist's point of view he ought to have been satisfied, since he brought down two fine specimens of African birds. One was a kind of partridge, a francolin, thirteen inches long, with short legs, dark grey back, red beak and claws, and elegant wings, shaded with brown. The other bird, with a red throat and white tail, was a species of falcon. The Bochjesman pioneer cleverly took off the skins, in order that they should be preserved entire.

The next day was half over, and the two young men were just about to start on their search, when a distant bark arrested them. Soon Mokoum, on his zebra, emerged at full speed from the thicket of aloes on the left, and advanced towards the camp.

"Welcome," cried Sir John joyfully, "we had almost given you up, and apart from you I should be inconsolable. I am only successful when you are with me. We will celebrate your return in a glass of usquebaugh."

Mokoum made no answer, but anxiously scanned and counted the Europeans. Colonel Everest perceived his perplexity, and as he was dismounting, said,—

"For whom are you looking, Mokoum?"

"For Mr. Palander," replied the bushman.

"Is he not with you?" said the Colonel.

"Not now," answered Mokoum. "I thought I should find him with you. He is lost!"

At these words, Matthew Strux stepped forward.

"Lost!" he cried. "He was confided to your care. You are responsible for his safety, and it is not enough to say he is lost."

Mokoum's face flushed, and he answered impatiently,—

"Why should you expect me to take care of one who can't take care of himself? Why blame me? If Mr. Palander is lost, it is by his own folly. Twenty times I have found him absorbed in his figures, and have brought him back to the caravan. But the evening before last he disappeared, and I have not seen him since. Perhaps if you are so clever, you can spy him out with your telescope."

The bushman would doubtless have become more irritable still, if Sir John had not pacified him. Matthew Strux had not been able to get in a word, but now turned round unexpectedly to the Colonel, saying,—

"I shall not abandon my countryman. I suppose that if Sir John Murray or Mr. Emery were lost, you would suspend operations; and I don't see why you should do less for a Russian than for an Englishman."

"Mr. Strux," cried the Colonel, folding his arms, and fixing his eyes on his adversary, "do you wish to insult me? Why should you suppose that we will not seek this blundering calculator?"

“Sir!” said Strux.

“Yes, blundering,” repeated the Colonel. “And to return to what you said, I maintain that any embarrassment to the progress of the operations from this circumstance would be due to the Russians alone.”

“Colonel,” cried Strux, with gleaming eyes, “your words are hasty.”

“My words, on the contrary, are well weighed. Let it be understood that operations are suspended until Mr. Palander is found. Are you ready to start?”

“I was ready before you spoke a word,” answered Strux sharply.

The caravan having now arrived, the disputants each went to his waggon. On the way Sir John could not help saying,—

“It is lucky that the stupid fellow has not carried off the double register.”

“Just what I was thinking,” said the Colonel.

The Englishmen proceeded more strictly to interrogate Mokoum. He told them that Palander had been missing for two days, and had last been seen alongside of the caravan about twelve miles from the encampment; that after missing him, he at once set out to seek for him, but being unsuccessful in all his search, had concluded that he must have made his way to his companions.

Mokoum proposed that they should now explore the

woods to the north-east, adding that they must not lose an hour if they wanted to find him alive, knowing that no one could wander with impunity for two days in a country infested like that with wild beasts. Where any one else could find a subsistence, Palander, ever engrossed by his figures, would inevitably die of starvation. At one o'clock, guided by the hunter, they mounted and left the camp. The grotesque attitudes of Strux, as he clung uneasily to his steed, caused considerable diversion to his companions, who, however, were polite enough to pass no remark.

Before leaving the camp, Mokoum asked the pioneer to lend him his keen-scented dog. The sagacious animal, after scenting a hat belonging to Palander, darted off in a north-easterly direction, whilst his master urged him on by a peculiar whistle. The little troop followed, and soon disappeared in the underwood.

All the day the Colonel and his companions followed the dog, who seemed instinctively to know what was required of him. They shouted, they fired their guns, but night came on when they had scoured the woods for five miles round, and they were at length obliged to rest until the following day. They spent the night in a grove, before which the bushman had prudently kindled a wood fire. Some wild howls were heard, by no means reassuring. Hours passed in arguing about Palander, and discussing plans for his assistance. The English showed as much

devotion as Strux could desire; and it was decided that all work should be adjourned till the Russian was found, alive or dead.

After a weary night the day dawned. The horses were saddled, and the little troop again followed the dog. Towards the north-east they arrived at a district almost swampy in its character. The small water-courses increased in number, but they were easily forded, care being taken to avoid the crocodiles, of which Sir John, for the first time in his life, now saw some specimens. The bushman would not permit that time should be wasted in any attack upon the reptiles, and restrained Sir John, who was always on the *qui-vive* to discharge a ball. Whenever a crocodile, snapping its prey with its formidable jaw, put its head out of water, the horses set off at a gallop to escape.

The troop of riders went on over woods, plains, and marshes, noting the most insignificant tokens : here a broken bough ; there a freshly-trodden tuft of grass ; or farther on some inexplicable mark ; but no trace of Palander.

When they had advanced ten miles north of the last encampment, and were about to turn south-east, the dog suddenly gave signs of agitation. He barked, and in an excited way wagged his tail. Sniffing the dry grass, he ran on a few steps, and returned to the same spot.

“The dog scents something,” exclaimed the bushman.

“It seems,” said Sir John, “he is on a right track.



“There he is,” cried Mokoum.—[Page 103.]

Listen to his yelping: he seems to be talking to himself. He will be an invaluable creature if he scents out Palander."

Strux did not quite relish the way in which his countryman was treated as a head of game; but the important thing now was to find him, and they all waited to follow the dog, as soon as he should be sure of the scent.

Very soon the animal, with a loud yelp, bounded over the thicket and disappeared. The horses could not follow through the dense forest, but were obliged to take a circuitous path. The dog was certainly on the right track now, the only question was whether Palander was alive or dead.

In a few minutes the yelping ceased, and the bushman and Sir John, who were in advance, were becoming uneasy, when suddenly the barking began again outside the forest, about half a mile away. The horses were spurred in that direction, and soon reached the confines of the marsh. The dog could distinctly be heard, but, on account of the lofty reeds, could not be seen. The riders dismounted, and tied their horses to a tree. With difficulty they made their way through the reeds, and reached a large space covered with water and aquatic plants. In the lowest part lay the brown waters of a lagoon half a mile square. The dog stopped at the muddy edge, and barked furiously.

"There he is!" cried Mokoum.

And sure enough, on a stump at the extremity of a sort of peninsula, sat Nicholas Palander, pencil in hand, and a note-book on his knees, wrapt in calculations. His friends could not suppress a cry. About twenty paces off a number of crocodiles, quite unknown to him, lay watching, and evidently designing an attack.

“Make haste,” said Mokoum, in a low voice ; “I don’t understand why these animals don’t rush on him.”

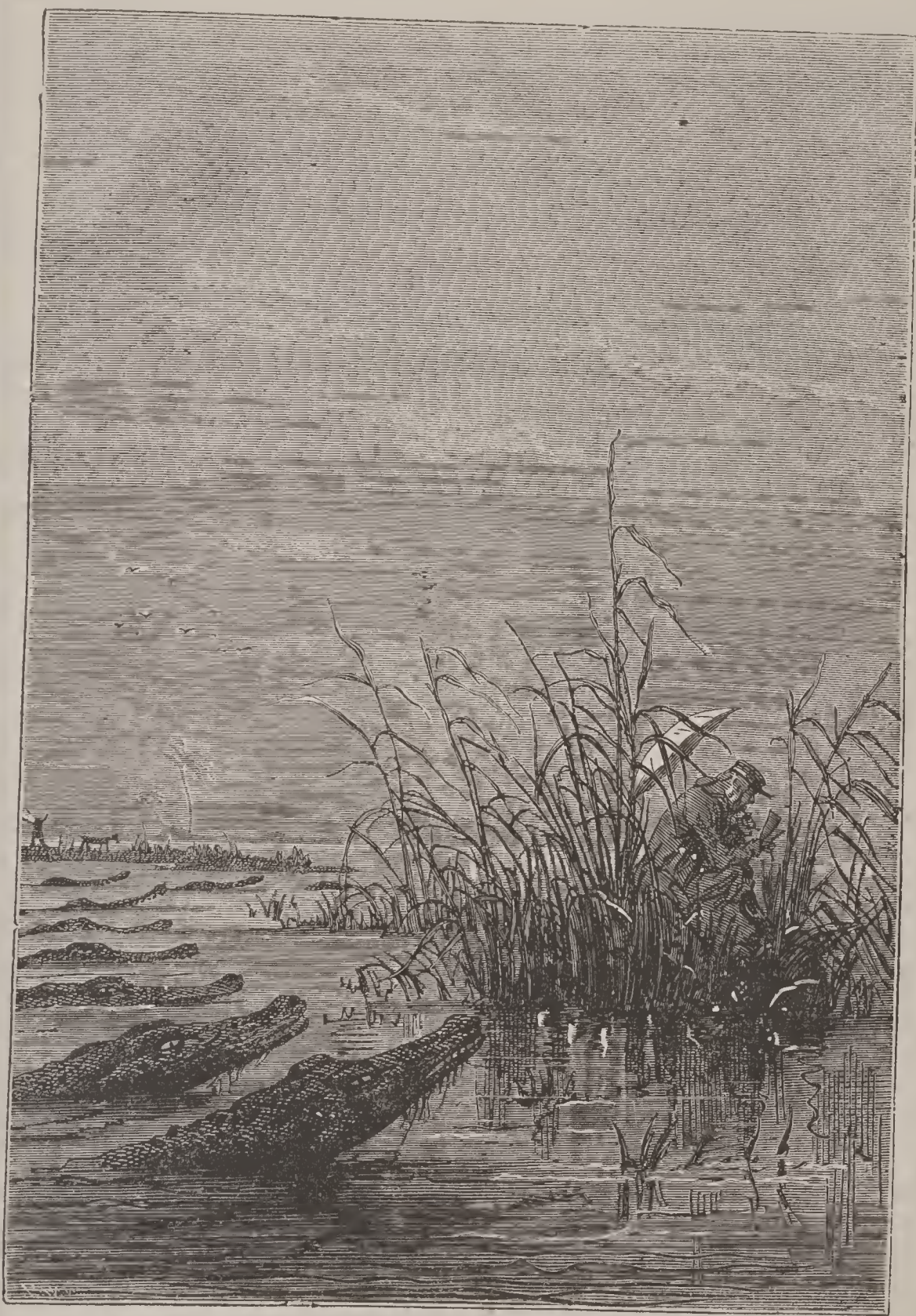
“They are waiting till he is gamey,” said Sir John, alluding to the idea common among the natives that these reptiles never touch fresh meat.

The bushman and Sir John, telling their companions to wait for them, passed round the lagoon, and reached the narrow isthmus by which alone they could get near Palander. They had not gone two hundred steps, when the crocodiles, leaving the water, made straight towards their prey. Palander saw nothing, but went on writing.

“Be quick and calm,” whispered Mokoum, “or all is lost.”

Both, kneeling down, aimed at the nearest reptiles, and fired. Two monsters rolled into the water with broken backs, and the rest simultaneously disappeared beneath the surface.

At the sound of the guns Palander raised his head. He recognized his companions, and ran towards them waving



A missing Companion.—[Page 104.]

his note-book, and like the philosopher of old exclaiming "Eureka!" he cried, "I have found it!"

"What have you found?" asked Sir John.

"An error in the last decimal of a logarithm of James Wolston's."

It was a fact. The worthy man had discovered the error, and had secured a right to the prize offered by Wolston's editor. For four days had the astronomer wandered in solitude. Truly Ampère, with his unrivalled gift of abstraction, could not have done better!

CHAPTER XII.

A STATION TO SIR JOHN'S LIKING.

So the Russian mathematician was found! When they asked him how he had passed those four days, he could not tell; he thought the whole story of the crocodiles was a joke, and did not believe it. He had not been hungry; he had lived upon figures. Matthew Strux would not reproach his countryman before his colleagues, but there was every reason to believe that in private he gave him a severe reprimand.

The geodetic operations were now resumed, and went on as usual till the 28th of June, when they had measured the base of the 15th triangle, which would conclude the second and commence the third degree of the meridian. Here a physical difficulty arose. The country was so thickly covered with underwood, that although the artificial signals could be erected, they could not be discerned at any distance. One station was recognized as available for an electric lamp. This was a mountain 1200 feet high, about

thirty miles to the north-west. The choice of this would make the sides of this triangle considerably longer than any of the former, but it was at length determined to adopt it. Colonel Everest, Emery, Zorn, three sailors, and two Bochesmen, were appointed to establish the lighted signal, the distance being too great to work otherwise than at night.

The little troop, accompanied by mules laden with the instruments and provisions, set off in the morning. The Colonel did not expect to reach the base of the mountain till the following day, and however few might be the difficulties of the ascent, the observers in the camp would not see the lighted signal till the night of the 29th or 30th.

In the interval of waiting, Strux and Palander went to their usual occupations, while Sir John and the bushman shot antelopes. They found opportunity of hunting a giraffe, which is considered fine sport. Coming across a herd of twenty, but so wild that they could not approach within 500 yards, they succeeded in detaching a female from the herd. The animal set off at first at a slow trot, allowing the horsemen to gain upon her; but when she found them near, she twisted her tail, and started at full speed. The hunters followed for about two miles, when a ball from Sir John's rifle threw her on to her side, and made her an easy victim.

In the course of the next night the two Russians took some altitudes of the stars, which enabled them to deter-

mine the latitude of the encampment. The following night was clear and dry, without moon and stars, and the observers impatiently watched for the appearance of the electric light. Strux, Palander, and Sir John relieved guard at the telescope, but no light appeared. They concluded that the ascent of the mountain had offered serious difficulty, and again postponed their observations till the next night. Great, however, was their surprise, when, about two o'clock in the afternoon, Colonel Everest and his companions suddenly reappeared in camp.

In answer to inquiries whether he had found the mountain inaccessible, Colonel Everest replied that although in itself the mountain was entirely accessible, it was so guarded that they had found it necessary to come back for reinforcements.

"Do you mean," said Sir John, "that the natives were assembled in force?"

"Yes, natives with four paws and black manes, who have eaten up one of our horses."

The Colonel went on to say that the mountain was only to be approached by a spur on the south-west side. In the narrow defile leading to the spur a troop of lions had taken up their abode. These he had endeavoured to dislodge, but, insufficiently armed, he was compelled to beat a retreat, after losing one of his horses by a single blow of a lion's paw.

The recital kindled the interest of Sir John and the bush-

man. Clearly it was a station worth conquering, and an expedition was at once arranged. All the Europeans, without exception, were eager to join, but it was necessary that some should remain at the camp to measure the angles at the base of the triangle, therefore the Colonel resolved to stay behind with Strux and Palander, while Sir John, Emery, and Zorn (to whose entreaties their chiefs had been obliged to yield), Mokoum, and three natives on whose courage he could rely, made up the party for the attack.

They started at four in the afternoon, and by nine were within two miles of the mountain. Here they dismounted, and made their arrangements for the night. No fire was kindled, Mokoum being unwilling to provoke a nocturnal attack from the animals, which he wished to meet by daylight.

Throughout the night the roar of the lions could almost incessantly be heard. Not one of the hunters slept for so much as an hour, and Mokoum took advantage of their wakefulness to give them some advice from his own experience.

"From what Colonel Everest tells us," he said calmly, "these are black-maned lions, the fiercest and most dangerous species of any. They leap for a distance of sixteen to twenty paces, and I should advise you to avoid their first bound. Should the first fail, they rarely take a second. We will attack them as they re-enter their den at day-

break ; they are always less fierce when they are well filled. But they will defend themselves well, for here, in this uninhabited district, they are unusually ferocious. Measure your distance well before you fire ; let the animal approach, and take a sure aim near the shoulder. We must leave our horses behind ; the sight of a lion terrifies them, and therefore the safety of their rider is imperilled. We must fight on foot, and I rely on your calmness."

All listened with silent attention : Mokoum was now the patient hunter. Although the lion seldom attacks a man without provocation, yet his fury, when once aroused, is terrible ; and therefore the bushman enjoined composure on his companions, especially on Sir John, who was often carried away by his boldness.

"Shoot at a lion," said Mokoum, "as calmly as if you were shooting a partridge."

At four o'clock, only a few red streaks being visible in the far east, the hunters tied up their horses securely and left their halting-place.

"Examine your guns, and be careful that your cartridges are in good trim," continued Mokoum, to those who carried rifles ; for the three natives were armed otherwise, satisfied with their bows of aloe, which already had rendered them good service.

The party, in a compact group, turned towards the defile, which had been partially reconnoitred the evening before.

They crept, like Red Indians, silently between the trees, and soon reached the narrow gorge which formed the entrance. Here, winding between piles of granite, began the path leading to the first slopes of the spur. Midway the path had been widened by a landslip, and here was the cave tenanted by the lions.

It was then arranged that Sir John, one of the natives, and Mokoum, should creep along the upper edge of the defile, with the intention of driving out the animals to the lower extremity of the gorge. There the two young Europeans and the other two Bochjesmen should be in ambush to receive the fugitive beasts with shot and arrows.

No spot could be better adapted for the manœuvres. The forked branches of a gigantic sycamore afforded a safe position, since lions do not climb; and the hunters, perched at a considerable height, could escape their bounds and aim at them under favourable conditions.

William Emery objected to the plan as being dangerous for Sir John and the bushman, but the latter would hear of no modification, and Emery reluctantly acquiesced.

Day now began to dawn, and the mountain-top was glowing in the sun. Mokoum, after seeing his four companions installed in the sycamore, started off with Sir John and the Bochjesman, and soon mounted the devious path which lay on the right edge of the defile. Cautiously

examining their path, they continued to advance. In the event of the lions having returned to their den and being at repose, it would be possible to make short work of them.

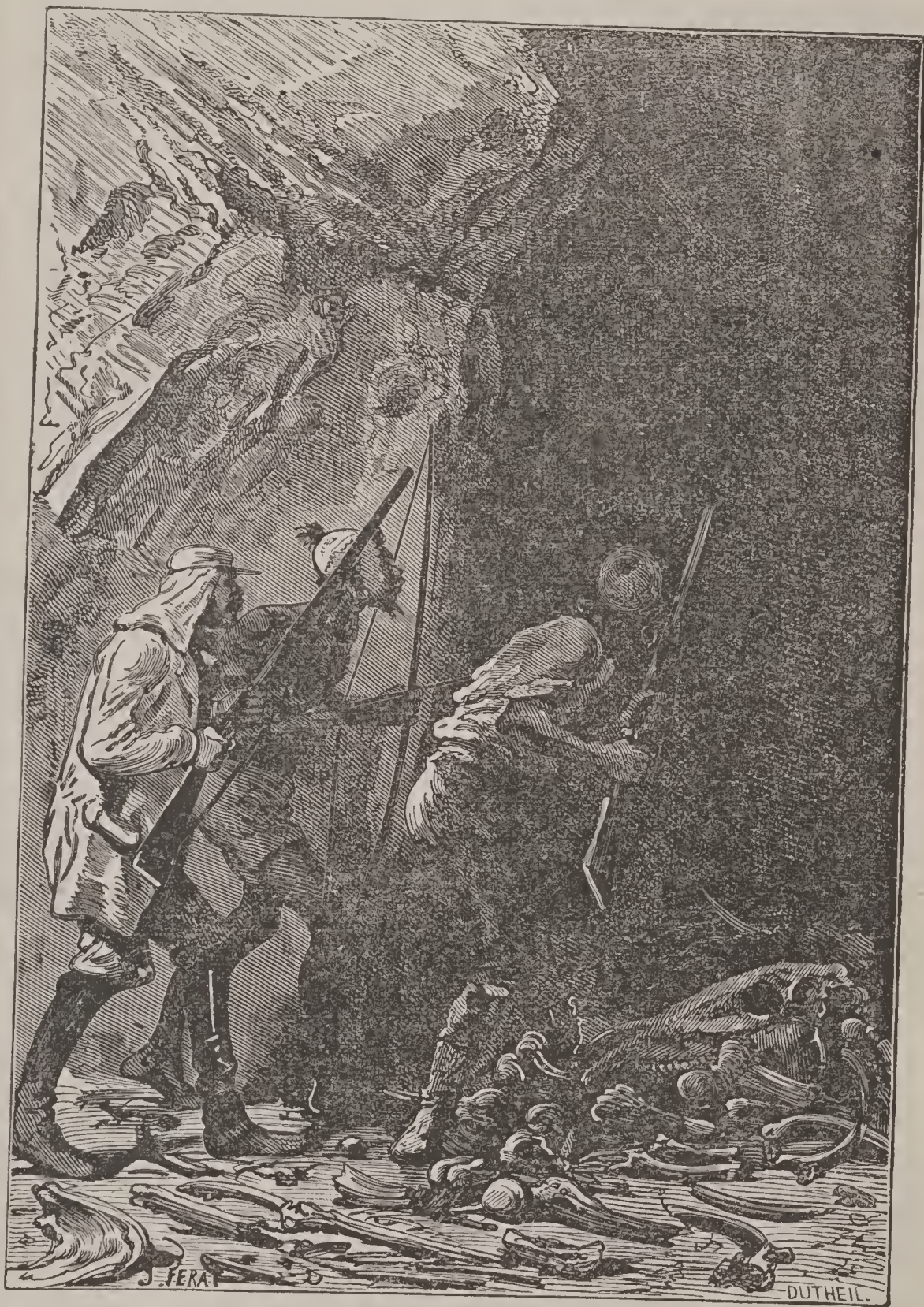
After about a quarter of an hour the hunters, reaching the landslip before the cave to which Zorn had directed them, crouched down and examined the spot. It seemed a wide excavation, though at present they could hardly estimate the size. The entrance was marked by piles of bones and remains of animals, demonstrating, beyond doubt, that it was the lions' retreat.

Contrary to the hunter's expectation, the cave seemed deserted. He crept to the entrance and satisfied himself that it was really empty. Calling his companions, who joined him immediately, he said,—

"Our game has not returned, Sir John, but it will not be long: I think we had better install ourselves in its place. Better to be besieged than besiegers, especially as we have an armed succour at hand. What do you think?"

"I am at your orders, Mokoum," replied Sir John.

All three accordingly entered. It was a deep grotto, strewn with bones and stained with blood. Repeating their scrutiny, lest they should be mistaken as to the cave being empty, they hastened to barricade the entrance by piling up stones, the intervening spaces being filled with boughs and dry brushwood. This only occupied a few



It was a deep Grotto, strewn with Bones and stained with Blood.—[Page 112.]



The Entrance to the Lion's Den.—[Page 112.]

minutes, the mouth of the cave being comparatively narrow. They then went behind their loop-holes, and awaited their prey, which was not long in coming. A lion and two lionesses approached within a hundred yards of the cave. The lion, tossing his mane and sweeping the ground with his tail, carried in his teeth an entire antelope, which he shook with as much ease as a cat would a mouse. The two lionesses frisked along at his side.

Sir John afterwards confessed that it was a moment of no little trepidation ; he felt his pulses beat fast, and was conscious of something like fear ; but he was soon himself again. His two companions retained their composure undisturbed.

At the sight of the barricade, the beasts paused. They were within sixty paces. With a harsh roar from the lion, they all three rushed into a thicket on the right, a little below the spot where the hunters had first stopped. Their tawny backs and gleaming eyes were distinctly visible through the foliage.

"The partridges are there," whispered Sir John ; "let us each take one."

"No," answered Mokoum softly, "the brood is not all here, and the report of a gun would frighten the rest. Bochjesman, are you sure of your arrow at this distance?"

"Yes, Mokoum," said the native.

“Then aim at the male’s left flank, and pierce his heart.”

The Bochjesman bent his bow, and the arrow whistled through the brushwood. With a loud roar, the lion made a bound and fell. He lay motionless, and his sharp teeth stood out in strong relief against his blood-stained lips.

“Well done, Bochjesman !” said Mokoum.

At this moment the lionesses, leaving the thicket, flung themselves on the lion’s body. Attracted by their roar, two other lions and a third lioness appeared round the corner of the defile. Bristling with anger, they looked twice their ordinary size, and bounded forward with terrific roars.

“Now for the rifles,” cried the bushman, “we must shoot them on the wing, since they will not perch.”

The bushman took deliberate aim, and one lion fell, as it were paralyzed. The other, his paw broken by Sir John’s bullet, rushed towards the barricade, followed by the infuriated lionesses. Unless the rifles could now be brought successfully to bear, the three animals would succeed in entering their den. The hunters retired ; their guns were quickly reloaded ; two or three lucky shots, and all would be well ; but an unforeseen circumstance occurred which rendered the hunters’ situation to the last degree alarming.

All at once a dense smoke filled the cave. One of the wads, falling on the dry brushwood, had set it alight, and soon a sheet of flames, fanned by the wind, lay between the



A Ball from the Bushman arrested the Lioness.—[Page 115.]

men and the beasts. The lions recoiled, but the hunters would be suffocated if they remained where they were. It was a terrible moment, but they dared not hesitate.

"Come out! come out!" cried Mokoum.

They pushed aside the brushwood with the butt ends of their guns, knocked down the stones, and, half choked, leaped out of the cloud of smoke.

The native and Sir John had hardly time to collect their senses when they were both knocked over. The African, struck on the chest by one of the lionesses, lay motionless on the ground; Sir John, who received a blow from the tail of the other, thought his leg was broken, and fell on his knees. But just as the animal turned upon him, a ball from the bushman arrested her, and, meeting a bone, exploded in her body. At this instant Zorn, Emery, and the two Bochjesmen appeared opportunely, although unsummoned, hastening up the defile. Two lions and one lioness were dead; but two lionesses and the lion with the broken paw were still sufficiently formidable. The rifles, however, performed their duty. A second lioness fell, struck in both head and flank. The third lioness and the wounded lion bounded over the young men's heads, and amid a last salute of balls and arrows disappeared round the corner of the defile.

Sir John uttered a loud hurrah. The lions were conquered, four carcasses measured the ground.

With his friend's assistance, Sir John was soon on his feet again ; his leg was not broken. The native soon recovered his consciousness, being merely stunned by the blow from the animal's head. An hour later, the little troop, without further trace of the fugitive couple, regained the thicket where they had left their horses.

"Well," said Mokoum to Sir John, "I hope you like our African partridges."

"Delightful ! delightful !" said Sir John, rubbing his leg, "but what tails they have, to be sure !"



Well," said Mokoum, "I hope you like our African Partridges."—[Page 116.]

CHAPTER XIII.

PACIFICATION BY FIRE.

AT the camp Colonel Everest and his colleagues, with a natural impatience, anxiously abided the result of the lion-hunt. If the chase proved successful, the light would appear in the course of the night. The Colonel and Strux passed the day uneasily; Palander, always engrossed, forgot that any danger menaced his friends. It might be said of him, as of the mathematician Bouvard, "He will continue to calculate while he continues to live;" for apart from his calculations life for him would have lost its purpose.

The two chiefs certainly thought quite as much of the accomplishment of their survey as of any danger incurred by their companions; they would themselves have braved any peril rather than have a physical obstacle to arrest their operations.

At length, after a day that seemed interminable, the night arrived. Punctually every half-hour the Colonel and

Matthew Strux silently relieved guard at the telescope, each desiring to be the first to discover the light. But hours passed on, and no light appeared. At last, at a quarter to three, Colonel Everest arose, and calmly said, "The signal!"

The Russian, although he did not utter a word, could scarcely conceal the chagrin which he felt at chance favouring the Colonel.

The angle was then carefully measured, and was found to be exactly $73^{\circ} 58' 42''.413$.

Colonel Everest being anxious to join his companions as soon as possible, the camp was raised at dawn, and by mid-day all the members of the Commission had met once more. The incidents of the lion-hunt were recounted, and the victors heartily congratulated.

During the morning Sir John, Emery, and Zorn had proceeded to the summit of the mountain, and had thence measured the angular distance of a new station situated a few miles to the west of the meridian. Palander also announced that the measurement of the second degree was now complete.

For five weeks all went on well. The weather was fine, and the country, being only slightly undulated, offered fair sites for the stations. Provisions were abundant, and Sir John's revictualling expeditions provided full many a variety of antelopes and buffaloes. The general health was

good, and water could always be found. Even the discussions between the Colonel and Strux were less violent, and each seemed to vie with the other in zeal for success, when a local difficulty occurred which for a while hindered the work and revived hostilities.

It was the 11th of August. During the night the caravan had passed through a wooded country, and in the morning halted before an immense forest extending beyond the horizon. Imposing masses of foliage formed a verdant curtain which was of indescribable beauty. There were the "gounda," the "mosokoso," and the "mokoumdon," a wood much sought for ship-building; great ebony trees, their bark covering a perfectly black wood; "bauhinias," with fibre of iron; "buchneras," with their orange-coloured flowers; magnificent "roodeblatts," with whitish trunks, crowned with crimson foliage, and thousands of "guaia-cums," measuring fifteen feet in circumference. There was ever a murmur like that of the surf on a sandy coast; it was the wind, which, passing across the branches, was calmed on the skirts of the forest. In answer to a question from the Colonel, Mokoum said,—

"It is the forest of Rovouma."

"What is its size?"

"It is about forty-five miles wide, and ten long."

"How shall we cross it?"

"Cross it we cannot," said Mokoum. "There is but

one resource : we must go round either to the east or to the west."

At this intelligence the chiefs were much perplexed. In the forest they could not establish stations ; to pass round would involve them in an additional series of perhaps ten auxiliary triangles.

Here was a difficulty of no little magnitude. Encamping in the shade of a magnificent grove about half a mile from the forest, the astronomers assembled in council. The question of surveying across the mass of trees was at once set aside, and it now remained to determine whether they should make the circuit to the east or the west, since the meridian passed as nearly as possible through the centre of the forest. On this point arose a violent discussion between the Colonel and Strux. The two rivals recovered their old animosity, and the discussion ended in a serious altercation. Their colleagues attempted to interfere, but to no purpose. The Englishman wished to turn to the right, since that direction approached the route taken by Dr. Livingstone in his expedition to the Zambesi Falls, and the country would on that account be more known and frequented. The Russian, on the contrary, insisted on going to the left, but apparently for no other reason than to thwart the Colonel. The quarrel went so far that a separation between the members of the Commission seemed imminent. Zorn, Emery, Sir John, and Palander with-

drew and left their chiefs to themselves. Such was their obstinacy that it seemed as if the survey must continue from this point in two oblique series of triangles.

The day passed away without any reconciliation, and the next morning Sir John, finding matters still in the same condition, proposed to Mokoum to beat the neighbourhood. Perhaps meanwhile the astronomers would come to an understanding: any way, some fresh venison would not be despised.

Mokoum, always ready, whistled to his dog Top, and the two hunters ventured several miles from the encampment. The conversation naturally turned on the subject of the difficulty.

"I expect," said the bushman, "we shall be encamped some time here. Our two chiefs are like ill-paired oxen, one pulls one way and the other another, and the consequence is that the waggon makes no headway."

"It is all very sad," answered Sir John, "and looks like a separation. The interests of science are compromised, otherwise I should be indifferent to it all. I should amuse myself with my gun until the rivals made it up."

"Do you think they *will* make it up? For my part, I am almost afraid that our halt will be indefinitely prolonged."

"I fear so, Mokoum," replied Sir John. "The matter is so trivial, and it is no question of science. Our chiefs would

doubtless have yielded to a scientific argument, but they will never make concession in a pure matter of opinion. How unfortunate that the meridian happens to cross this forest !”

“ Hang the forests !” exclaimed the bushman, “ don’t let them stop your measuring, if you want to measure. But I can’t see the good of your getting at the length and breadth of the earth ? Who will be any better off when every thing is reduced to feet and inches ? I should just like to think of the globe as infinite ; to measure it is to make it small. No, Sir John, if I were to live for ever, I could never understand the use of your operations.”

Sir John could not help smiling. They had often debated the subject, and the ignorant child of nature could evidently not enter into the interest attached to the survey. Whenever Sir John attempted to convince him, he answered eloquently with arguments stamped with a genuine naturalness, of which Sir John, half-*savant* and half-hunter, could fully appreciate the charm.

Thus conversing, the hunters pursued the rock-hares, the shrill-toned plovers, the partridges (with brown, yellow, and black plumage), and other small game. But Sir John had all the sport to himself. The bushman seldom fired ; he was pre-occupied. The quarrel between the two astronomers seemed to trouble him more than it did his companion, and the variety of game hardly attracted his notice.

In truth there was an idea floating through his brain, which, little by little, took more definite form. Sir John heard him talking to himself, and watched him as he quietly let the game pass by, as engrossed as Palander himself. Two or three times in the course of the day he drew near Sir John and said,—

“So you really think that Colonel Everest and Mr. Strux will not come to terms?”

Sir John invariably replied that agreement seemed unlikely, and that he feared there would be a separation between Englishmen and Russians. The last time Mokoum received this answer he added,—

“Well, you may be easy; I have found a means to satisfy both the chiefs. Before to-morrow, if the wind is favourable, they will have nothing to quarrel about.”

“What do you mean to do, Mokoum?”

“Never mind, Sir John.”

“Very well, I will leave it to you. You deserve to have your name preserved in the annals of science.”

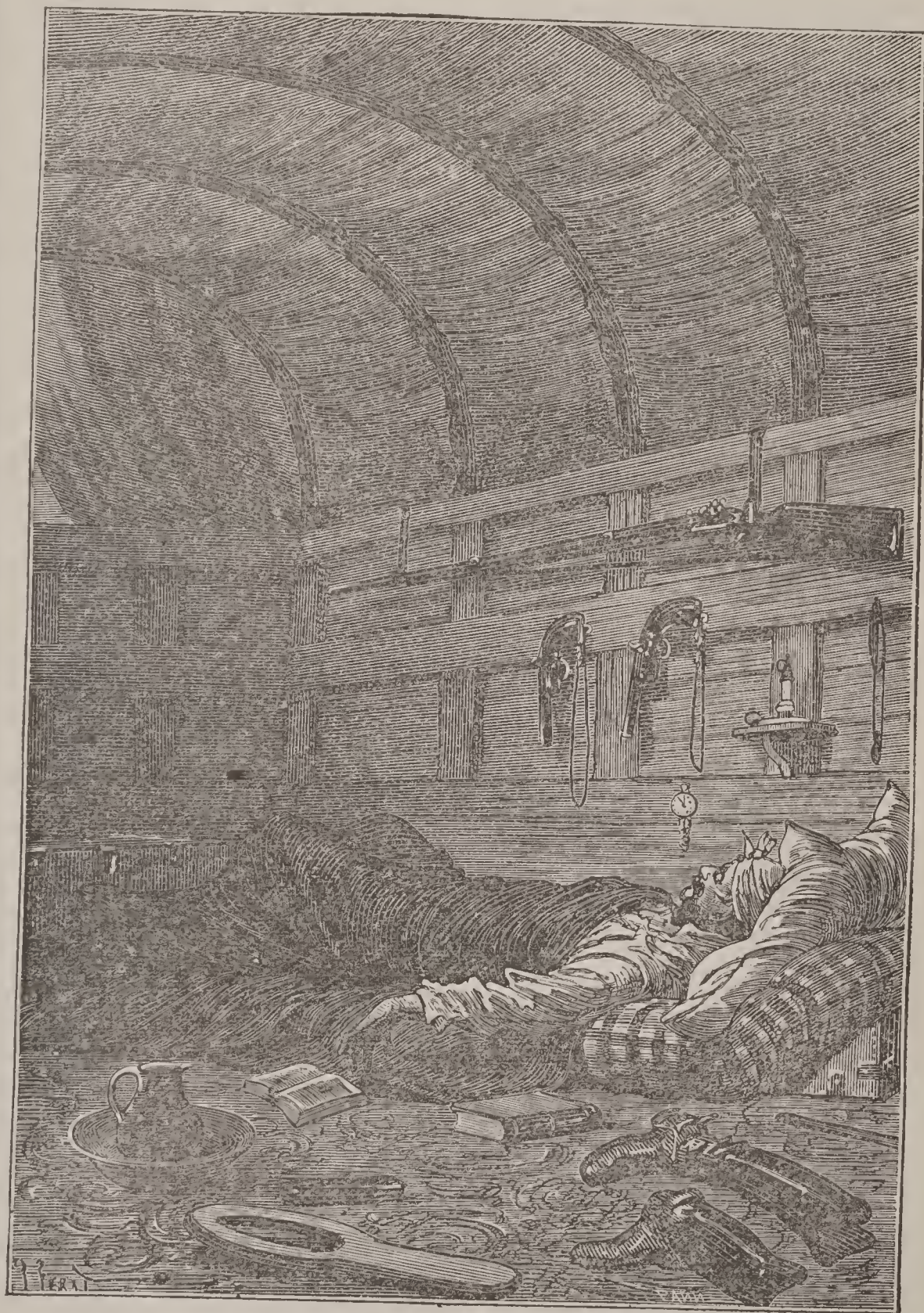
“That would be too great an honour for me, Sir John,” answered the bushman, and then continued silently to ponder over his project. Sir John made no further inquiries, but could not at all guess how the bushman proposed to re-unite the two adversaries.

Towards evening the hunters returned to camp, and

found matters even worse than before. The oft-repeated intervention of Zorn and Emery had been of no avail, and the quarrel had now reached such a height that reconciliation seemed impossible. It appeared only too probable that the survey would be continued in two separate directions. The thought of this was sorrowful to Emery and Zorn, who were now so nearly bound by mutual sympathy. Sir John guessed their thoughts, and was eager to reassure them ; but however much he was secretly disposed to trust to the bushman, he abstained from raising any hopes which might be fallacious.

Throughout the evening Mokoum did not leave his ordinary occupations. He arranged the sentinels, and took the usual precautions. Sir John began to think that he had forgotten his promise. Before going to rest he tried to sound Colonel Everest, whom he found immovably resolved that, unless Strux yielded, the English and Russians must part. "There are things," added the Colonel, in a tone of decision, "that cannot be borne, even from a colleague."

Sir John, very uneasy, retired to his bed, and being fatigued with his day's sport, was soon asleep. Towards eleven o'clock he was suddenly aroused by the natives running to and fro in the camp. He quickly rose, and found every one on their feet. The forest was on fire. In the dark night, against the black sky, the curtain of flame



Sir John was soon asleep.— [Page 124.]



The Forest on Fire.—[Page 125.]

seemed to rise to the zenith ; and in this incredibly short time the fire had extended for several miles.

Sir John looked at Mokoum, who, standing near, made no answer to his glance ; but he at once understood. The fire was designed to open a road through that forest which had stood impervious for ages. The wind, from the south, was favourable. The air, rushing as from a ventilator, accelerated the conflagration, and furnished an ever fresh supply of oxygen. It animated the flames, and kept the kindled branches burning like a myriad brands. The scattered fragments became new centres for fresh outbreaks of flame ; the scene of the fire became larger, and the heat grew intense. The dead wood piled under the dark foliage crackled, and ever and anon louder reports and a brighter light told that the resinous trees were burning like torches. Then followed explosions like cannonades, as the great trunks of ironwood burst asunder with a reverberation as of bombs. The sky reflected the glow, and the clouds carried the rosy glare high aloft. Showers of sparks emitted from the wreaths of smoke studded the heavens like red-hot stars.

Then, on every side, were heard the howls, shrieks, and bellowings of herds of bewildered hyenas, buffaloes, and lions ; elephants rushed in every direction, like huge dark spectres, and disappeared beyond the horizon.

The fire continued throughout the following day and

night; and when day broke on the 14th a vast space, several miles wide, had been opened across the forest. A passage was now free for the meridian. The daring genius of Mokoum had arrested the disaster which threatened the survey.

CHAPTER XIV.

A DECLARATION OF WAR.

ALL pretext for quarrelling being now removed, the Colonel and Strux, somewhat rancorous at heart, recommenced their joint labours. About five miles to the left of the gap made by the conflagration, rose an eminence which would serve as the vertex of a new triangle. When the requisite observations were complete, the caravan set off across the burnt forest.

The road was paved with embers. The soil was still burning, and here and there smouldered stumps of trees, while a hot steam rose around. In many places lay the blackened carcasses of animals which had been unable to make their escape. Wreaths of smoke gave evidence that the fire was not yet extinct, and might still be rekindled by the wind. Had the flames burst out again the caravan must inevitably have been destroyed. Towards the middle of the day, however, it was safely encamped at the foot of the hill. Here was a mass of rock which seemed to

have been arranged by the hand of man. It was a kind of cromlech—a surprising erection to find in that locality—resembling the structures attributed to the Druids, and which ever furnish fresh interest to the archæologist. The most credible suggestion was that it must be the remains of some primitive African altar.

The two young astronomers and Sir John Murray wished to visit the fantastic construction, and, accompanied by the bushman, they ascended the slope. They were not above twenty paces from the cromlech when a man, hitherto concealed behind one of the massy stones at the base, appeared for a moment, and, descending the hill, stole quickly away into a thicket that had been untouched by the fire. The momentary glance was enough for the bushman. “A Makololo!” he cried, and rushed after the native. Sir John followed, and both in vain searched the wood. The native, knowing the short paths, had escaped where the most experienced hunter could not have traced him. When the incident was related to Colonel Everest he sent for Mokoum, and asked him who the man was? what he was doing? and why he had followed him?

“He is a Makololo, Colonel,” replied Mokoum. “He belongs to one of the northern tribes that haunt the affluents of the Zambesi. Not only is he an enemy of us Bochjesmen, but he is a plunderer of all who venture into the country; he was spying us, and we shall be lucky

if we have not cause to regret that we couldn't get hold of him."

"But what have we to fear from a band of robbers?" asked the Colonel; "are not our numbers sufficient to resist them?"

"At present, yes," replied the bushman; "but in the north these tribes are more frequent, and it is difficult to avoid them. If this Makololo is a spy, as I suspect, he will not fail in putting several hundred of these robbers on our track, and then, Colonel, I would not give a farthing for all your triangles."

The Colonel was vexed. He knew that the bushman was not the man to exaggerate danger, and that all he said ought to be duly weighed. The intentions of the native were certainly suspicious; his sudden appearance and immediate flight showed that he was caught deliberately spying. No doubt he would announce the approach of the Commission to the tribes of the north. There was, however, no help for it now; the caravan must continue its march with extra precautions.

On the 17th of August the astronomers completed their twenty-second triangle, and with it the third degree of the meridian. Finding by the map that the village of Kolobeng was about 100 miles to the north-east, they resolved to turn thither for a few days' rest. For nearly six months they had had no communication with the

civilized world, and at Kolobeng, an important village and missionary station, they would probably hear news from Europe, besides being able to re-provision the caravan.

The remarkable cromlech was at once chosen as the landmark whence subsequent operations should commence, and the Colonel gave the signal for departure. With no further incident the caravan reached Kolobeng on the 22nd. The village was merely a mass of native huts, the uniformity of which was relieved by the depôt of the missionaries who had settled there. Formerly called Lepelolé, it is marked on some maps Litoubarouka. Here Dr. Livingstone stayed for some months in 1843, to learn the habits of the Bechuanas, or Bakouins, as they are more generally termed in this part of the country.

With all hospitality the missionaries received the Europeans, and put every available resource at their disposal. Livingstone's house was still to be seen, sacked and ruined, as when visited by Baldwin; the Boërs had not spared it in their incursion of 1852.

All eagerly asked for news from Europe; but their curiosity could not be immediately satisfied, as no courier had reached the mission in the last six months; but in about a week the principal said they expected journals and despatches, since they had already heard of the arrival of a carrier on the banks of the Upper Zambesi. A week was just the period that the astronomers desired for their rest,

and all except Palander, who constantly revised his calculations, passed the time in a complete *far niente*. The stern Matthew Strux held himself aloof from his English colleagues, and Emery and Zorn took many walks in the neighbourhood. The firmest friendship united these two, and they believed that nothing could break the closeness of their sympathy.

On the 30th the eagerly-expected messenger arrived. He was a native of Kilmaine, a town by the delta of the Zambesi. A merchantman from the Mauritius, trading in gum and ivory, had landed on that coast early in July, and delivered the despatches for the missionaries. The papers were dated two months back, for the native had taken four weeks to ascend the Zambesi.

On the arrival of the messenger, the principal of the mission had handed to Colonel Everest a bundle of European newspapers, chiefly the *Times*, the *Daily News*, and the *Journal des Débats*. The intelligence they contained had, under the circumstances, a special importance, and produced an unexpected emotion among the entire party.

The members of the Commission were altogether in the chief room of the mission. Colonel Everest drew out the *Daily News* for the 13th of May, with the intention of reading aloud to his colleagues. Scarcely had he glanced at the first leading article, when his brow contracted, and

the paper trembled in his hand. In a few moments he recovered his usual composure.

"What does the paper say, Colonel?" asked Sir John.

"It is grave news, gentlemen," said the Colonel, "that I have to communicate."

He kept the paper in his hand, and his colleagues waited eagerly for him to speak. To the surprise of all he rose, and, advancing to Matthew Strux, said,—

"Before communicating the intelligence conveyed in this paper, I should wish to make an observation to you."

"I am ready to hear any thing you may say," said Strux, much astonished.

The Colonel then said solemnly,—

"Mr. Strux, hitherto there has been between us a rivalry more personal than scientific, which has rendered our co-operation in the common cause somewhat difficult. This, I believe, is to be attributed to the fact of there being *two* of us at the head of this expedition. To avoid antagonism, there should be only one chief to every enterprise. You agree with me, do you not?"

Strux bowed in assent. The Colonel went on,—

"This position, unpleasant for each of us, must, through recent circumstances, now be changed. First, sir, let me say that I esteem you highly, as your position in the scientific world demands. I beg you to believe that I regret all that has passed between us."



“ War is declared between England and Russia.”—[Page 133.]

These words were uttered with great dignity, even with pride. There was no humiliation in the voluntary apology, so nobly expressed, and neither Strux nor his colleagues could guess his motive. Perhaps the Russian, not having the same incentive, was not equally disposed to forget any personal resentment. However, mastering his ill-feeling, he replied,—

“With you, Colonel, I think that no rivalry on our part should be permitted to injure the scientific work with which we are entrusted. I likewise hold *you* in the esteem that your talents deserve, and in future I will do all in my power to efface any personality from our relations. But you spoke of a change ; I do not understand——”

“You will soon be made to understand, Mr. Strux,” replied the Colonel, with a touch of sadness in his tone, “but first give me your hand.”

“Here it is,” rejoined Strux, with a slight hesitation. Without another word the astronomers joined hands.

“Now you are friends,” cried Sir John.

“Alas ! no,” said the Colonel, dropping the Russian’s hand ; “henceforth we are enemies, separated by an abyss which must keep us apart even on the territory of science.”

Then turning to his colleagues, he added,—

“Gentlemen, war is declared between England and Russia. See, the news is conveyed by these English, French, and Russian newspapers.

And, in truth, the war of 1854 had begun. The English, with their allies the French and Turks, were fighting before Sebastopol, and the Eastern question was being submitted to the ordeal of a naval conflict on the Black Sea.

The Colonel's words fell like a thunderbolt. The English and Russians, with their strong sentiment of nationality, started to their feet. Those three words, "War is declared," were enough. They were no longer companions united in a common labour, but already eyed one another as avowed antagonists. Such is the influence of these national duels on the heart of man. An instinctive impulse had divided the Europeans—Nicholas Palander himself yielding to the feeling: Emery and Zorn alone regarded each other with more of sadness than animosity, and regretted that they had not shaken hands before Colonel Everest's communication. No further conversation ensued; exchanging bows, English and Russians retired.

This novel situation, although it would not interrupt the survey, would render its continuation more difficult. For the interest of its country, each party desired to pursue the operations; but the measurements must be carried along two different meridians. In a formal interview subsequently arranged between the chiefs, it was decided by lot that the Russians should continue the meridian already begun, while the English should choose an arc 60 or 80 miles to the west, and unite it to the first by a series of



The Parting of Emery and Zorn.—[Page 135.]

auxiliary triangles ; they would then continue their survey as far as lat. 20° .

All these arrangements were made without any outbreak : personal rivalry was swallowed up by national feeling, and the Colonel and Strux did not exchange an uncivil word, but kept within the strictest limits of politeness.

The caravan was equally divided, each party preserving its own stores. The steam-boat fell by lot to the Russians.

Mokoum, especially attached to Sir John, followed the English caravan. The pioneer, equally experienced, headed the Russians. Each party retained its instruments and one of the registers.

On the 31st of August the Commission divided. The English cordially thanked the missionaries for their kind hospitality, and started first to connect their last station with their new meridian.

If, before their departure, any one had entered the privacy of the inner room, he would have seen Emery grasping the hand of Zorn, once his friend, but now, by the will of their Majesties the Queen of England and the Czar of Russia, no longer friend, but foe.

CHAPTER XV.

A GEOMETRIC PROGRESSION.

AFTER the separation the English astronomers continued their labours with the same care and precision as hitherto. Three had now to do the work of six, and consequently the survey advanced more slowly, and was attended with more fatigue; but they were not the men to spare themselves; the desire that the Russians should not surpass them in any way sustained them in their task, to which they gave all their time and thoughts. Emery had to indulge in fewer reveries, and Sir John could not so often spare his time for hunting. A new programme was drawn up, assigning to each astronomer his proper share of the labour. Sir John and the Colonel undertook all observations both in the sky and in the field; while Emery replaced Palander as calculator. All questions were decided in common, and there was no longer any fear that disagreement should arise. Mokoum was still the guide and hunter to the caravan. The English sailors, who formed half the crew of the "Queen and Czar," had,

of course, followed their countrymen; and although the Russians were in possession of the steam-vessel, the India-rubber boat, which was large enough for ordinary purposes, was the property of the English. The provision-waggons were divided, thus impartially ensuring the revictualling of each caravan. The natives likewise had to be severed into two equal troops, not without some natural signs of displeasure on their part; far from their own pasturages and water-courses, in a region inhabited by wandering tribes hostile to the tribes of the south, they could scarcely be reconciled to the prospect of separation. But at length, by the help of the bushman and the pioneer, who told them that the two detachments would be comparatively a short distance apart, they consented to the arrangement.

On leaving Kolobeng the English caravan re-entered the burnt forest and arrived at the cromlech which had served for their last station. Operations were resumed, and a large triangle carried the observers at once ten or twelve miles to the west of the old meridian.

Six days later the auxiliary series of triangles was finished, and Colonel Everest and his colleagues, after consulting the maps, chose the new arc one degree west of the other, being 23° east of the meridian of Greenwich. They were not more than sixty miles from the Russians, but this distance put any collision between the two parties

out of the question, as it was improbable that their triangles would cross.

All through September the weather was fine and clear. The country was fertile and varied, but scantily populated. The forests, which were few, being broken by wide, open tracts, and with occasional mounds occurring in the prairies, made the district extremely favourable for the observations. The region was well provided with natural productions. The sweet scent of many of the flowers attracted swarms of scarabæi, and more especially a kind of bee as nearly as possible like the European, depositing in clefts of rocks and holes of trees a white liquid honey with a delicious flavour. Occasionally at night large animals ventured near the camp; there were giraffes, varieties of antelopes, hyenas, rhinoceroses, and elephants. But Sir John would not be distracted, he resolutely discarded his rifle for his telescope.

Under these circumstances, Mokoum and some of the natives became purveyors to the caravan, and Sir John had some difficulty in restraining his excitement when he heard the report of their guns. The bushman shot three prairie-bufialoes, the Bokolokolos of the Bechuanas, formidable animals, with glossy black skins, short strong legs, fierce eyes, and small heads crowned with thick black horns. They were a welcome addition to the fresh venison which formed the ordinary fare.

The natives prepared the buffalo-meat as the Indians of the north do their pemmican. The Europeans watched their proceedings with interest, though at first with some repugnance. The flesh, after being cut into thin slices and dried in the sun, was wrapped in a tanned skin, and beaten with flails till it was reduced to a powder. It was then pressed tightly into leathern sacks, and moistened with boiling tallowy suet collected from the animal itself. To this they added some marrow and berries, whose saccharine matter modified the nitrous elements of the meat. This compound, after being mixed and beaten, formed, when cold, a cake as hard as a stone. Mokoum, who considered his pemmican a national delicacy, begged the astronomers to taste the preparation. At first they found it extremely unpalatable, but, becoming accustomed to the flavour, they soon learnt to partake of it with great relish. Highly nourishing, and not at all likely to be tainted, containing, moreover, its nutritive elements closely compacted, this pemmican was exactly suited to meet the wants of a caravan travelling in an unknown country. The bushman soon had several hundred pounds in reserve, and they were thus secure from any immediate want.

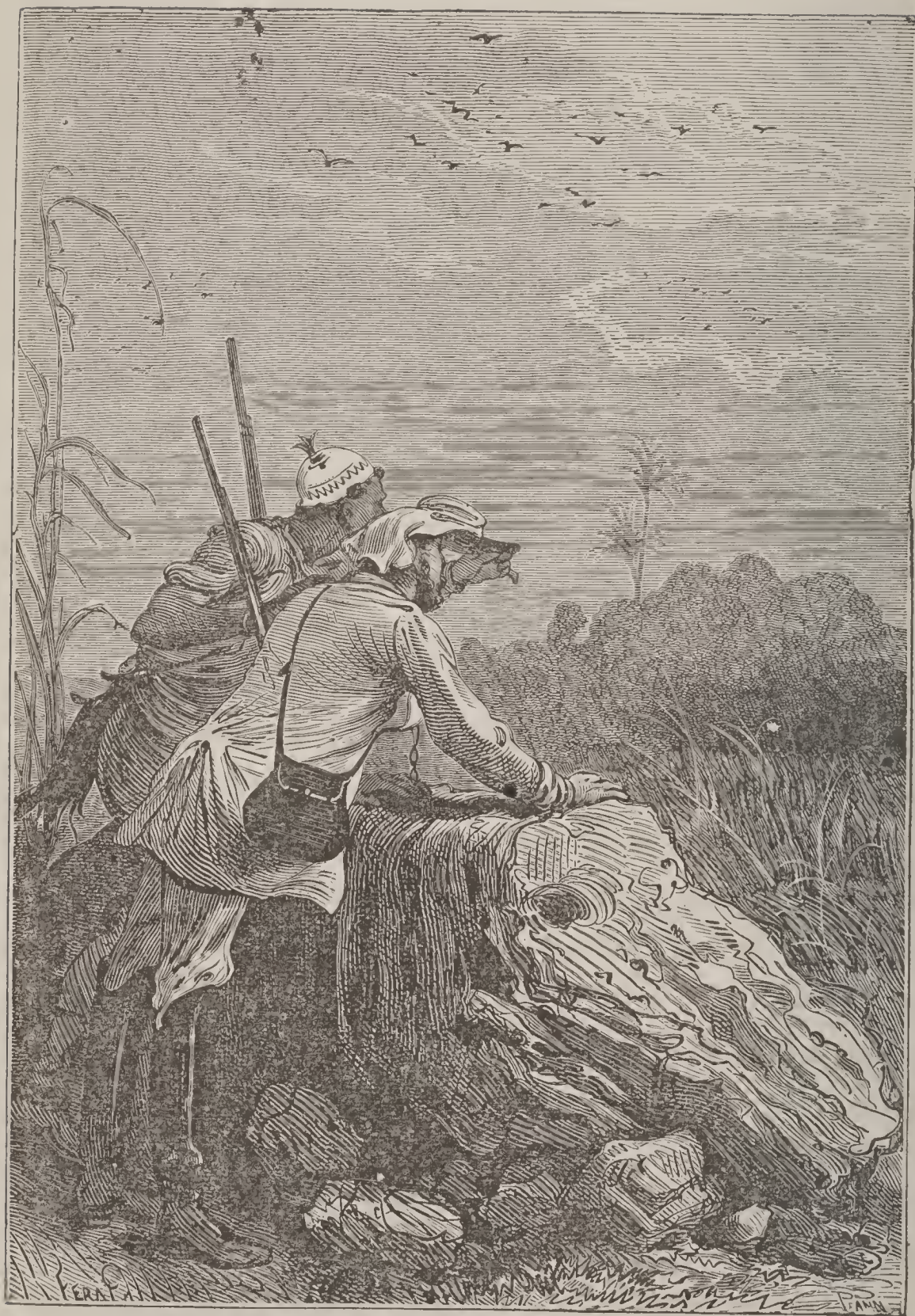
Days and nights passed away in observations. Emery was always thinking of his friend, and deploring the fate which had so suddenly severed the bond of their friendship. He had no one to sympathize with his admiration

of the wild characteristics of the scenery, and, with something of Palander's enthusiasm, found refuge in his calculations. Colonel Everest was cold and calm as ever, exhibiting no interest in any thing beyond his professional pursuits. As for Sir John, he suppressed his murmurs, but sighed over the loss of his freedom. Fortune, however, sometimes made amends; for although he had no leisure for hunting, the wild beasts occasionally took the initiative, and came near, interrupting his observations. He then considered defence legitimate, and rejoiced to be able to make the duties of the astronomer and of the hunter to be compatible.

One day he had a serious rencontre with an old rhinoceros, which cost him "rather dear." For some time the animal had been prowling about the flanks of the caravan. By the blackness of his skin Mokoum had recognized the "chucuroo" (such is the native for this animal) as a dangerous beast, and one which, more agile than the white species, often attacks man and beast without any provocation.

On this day Sir John and Mokoum had set off to reconnoitre a hill six miles away, on which the Colonel wished to establish an indicating-post. With a certain foreboding, Sir John had brought his rifle with conical shot instead of his ordinary gun; for although the rhinoceros had not been seen for two days, yet he did not consider it





“The Rhinoceros!” exclaimed Sir John.—[Page 141.]

advisable to traverse unarmed an unknown country. Mokoum and his companions had already unsuccessfully chased the beast, which probably now had abandoned its designs. There was no reason to regret the precaution. The adventurers had reached the summit of the hill, when at the base, close to a thicket, of no large extent, appeared the chucuroo. He was a formidable animal; his small eyes sparkled, and his horns, planted firmly one over the other on his bony nose, furnished a most powerful weapon of attack.

The bushman caught sight of him first, as he crouched about half a mile distant in a grove of lentisk.

"Sir John," he cried, "fortune favours you: here is your chucuroo!"

"The rhinoceros!" exclaimed Sir John, with kindling eyes, for he had never before been so near the animal.

"Yes; a magnificent beast, and he seems inclined to cut off our retreat," said the bushman. "Why he should attack us, I can hardly say; his tribe is not carnivorous: but any way, there he is, and we must hunt him out."

"Is it possible for him to get up here to us?" asked Sir John.

"No; his legs are too short and thick, but he will wait."

"Well, let him wait," said Sir John; "and when we have examined this station, we will try and get him out."

They then proceeded with their reconnoitring, and chose

a spot on which to erect the indicating-post. They also noticed other eminences to the north-west which would be of use in constructing a subsequent triangle.

Their work ended, Sir John turned to the bushman, saying, "When you like, Mokoum."

"I am at your orders, Sir John: the rhinoceros is still waiting."

"Well, let us go down, a ball from my rifle will soon settle matters."

"A ball!" cried Mokoum; "you don't know a rhinoceros. He won't fall with one ball, however well it may be aimed."

"Nonsense!" began Sir John, "that is because people don't use conical shot."

"Conical or round," rejoined the bushman, "the first will not bring down such an animal as that."

"Well," said Sir John, carried away by his self-confidence, "as you have your doubts, I will show you what our European weapons can do."

And he loaded his rifle, to be ready to take aim as soon as he should be at a convenient distance.

"One moment, Sir John," said the bushman, rather piqued, "will you bet with me?"

"Certainly," said Sir John.

"I am only a poor man," continued Mokoum, "but I will willingly bet you half-a-crown against your first ball."

“Done!” replied Sir John instantly. “Half-a-crown to you if the rhinoceros doesn’t fall to my first shot.”

The hunters descended the steep slope, and were soon posted within range of the rhinoceros. The beast was perfectly motionless, and on that account presented an easy aim.

Sir John thought his chance so good, that at the last moment he turned to Mokoum and said,—

“Do you keep to your bargain?”

“Yes,” replied the bushman.

The rhinoceros still being as motionless as a target, Sir John could aim wherever he thought the blow would be mortal. He chose the muzzle, and, his pride being roused, he aimed with the utmost care, and fired. The ball failed in reaching the flesh; it had merely shattered to fragments the extremity of one of the horns. The animal did not appear to experience the slightest shock.

“That counts nothing,” said the bushman, “you didn’t touch the flesh.”

“Yes, it counts,” replied Sir John, rather vexed; “I have lost my wager. But come now, double or quits?”

“As you please, Sir John, but you will lose.”

“We shall see.”

The rifle was carefully re-loaded, and Sir John, taking rather a random aim, fired a second time; but meeting the horny skin of the haunch, the ball, notwithstanding its

force, fell to the ground. The rhinoceros moved a few steps.

“A crown to me,” said Mokoum.

“Will you stake it again?” asked Sir John, “double or quits.”

“By all means,” said Mokoum.

This time Sir John, who had begun to get angry, regained his composure, and aimed at the animal’s forehead. The ball rebounded, as if it had struck a metal plate.

“Half-a-sovereign,” said the bushman calmly.

“Yes, and another,” cried Sir John, exasperated.

The shot penetrated the skin, and the rhinoceros made a tremendous bound ; but instead of falling, he rushed furiously upon the bushes, which he tore and crushed violently.

“I think he still moves,” said the bushman quietly.

Sir John was beside himself ; his composure again deserted him, and he risked the sovereign he owed the bushman on a fifth ball. He continued to lose again and again, but persisted in doubling the stake at every shot. At length the animal, pierced to the heart, fell, impotent to rise to its feet.

Sir John uttered a loud hurrah ; he had killed his rhinoceros. He had forgotten his disappointment, but he did not forget his bets. It was startling to find that the perpetually redoubled stakes had mounted at the ninth

shot to 32/. Sir John congratulated himself on his escape from such a debt of honour; but in his enthusiasm he presented Mokoum with several gold pieces which the bushman received with his usual equanimity.

CHAPTER XVI.

DANGER IN DISGUISE.

By the end of September the astronomers had accomplished half their task. Their diminished numbers added to their fatigue, so that, notwithstanding their zeal, they occasionally had to recruit themselves by resting for several days. The heat was very overpowering. October in lat. 24° S. corresponds to April in Algeria, and for some hours after mid-day work was impossible. The bushman was alone uneasy at the delay, for he was aware that the arc was about to pass through a singular region called a "karroo," similar to that at the foot of the Roggeveld mountains in Cape Colony. In the damp season this district presents signs of the greatest fertility ; after a few days of rain the soil is covered with a dense verdure ; in a very short time flowers and plants spring up every where ; pasturage increases, and water-courses are formed ; troops of antelopes descend from the heights and take possession of these unexpected prairies. But this strange effort of nature is of short duration. In a month, or six weeks

at most, all the moisture is absorbed by the sun ; the soil becomes hardened, and chokes the fresh germs ; vegetation disappears in a few days ; the animals fly the region ; and where for a while there was a rich fertility, the desert again asserts its dominion.

This karroo had to be crossed before reaching the permanent desert bordering on Lake Ngami. The bushman was naturally eager to traverse this region before the extreme aridity should have exhausted the springs. He explained his reasons to the Colonel, who perfectly understood, and promised to hurry on the work, without suffering its precision to be affected. Since, on account of the state of the atmosphere, measuring was not always practicable, the operations were not unfrequently retarded, and the bushman became seriously concerned lest when they reached the karroo its character of fertility should have disappeared.

Meanwhile the astronomers could not fail to appreciate the magnificence around. Never had they been in finer country. In spite of the high temperature, the streams kept up a constant freshness, and thousands of flocks would have found inexhaustible pasturage. Clumps of luxuriant trees rose here and there, giving the prospect at times the appearance of an English park.

Colonel Everest was comparatively indifferent to these beauties, but the others were fully alive to the romantic

aspect of this temporary relief to the African deserts. Emery now especially regretted the alienation of his friend Zorn, and often thought how they would have mutually delighted in the charming scenery around them.

The advance of the caravan was enlivened by the movements as well as by the song-notes of a variety of birds. Some of these were edible, and the hunters shot some brace of "korans," a sort of bustard peculiar to the South African plains, and some "dikkops," whose flesh is very delicate eating. They were frequently followed by voracious crows, instinctively seeking to avert attention from their eggs in their nests of sand. In addition to these, blue cranes with white throats, red flamingoes, like flames in the thinly scattered brushwood, herons, curlews, snipes, "kalas," often perching on a buffalo's neck, plovers, ibises, which might have flown from some hieroglyphic obelisk, hundreds of enormous pelicans marching in file,—all were observed to find congenial habitats in this district, where man alone is the stranger. But of all the varieties of the feathered race, the most noticeable was the ingenious weaver-bird, whose green nests, woven with rushes and blades of grass, hung like immense pears from the branches of the willows. Emery, taking them for a new species of fruit, gathered one or two, and was much surprised to hear them twitter like sparrows. There seemed some excuse for the ancient travellers in Africa, who reported that



The Advance of the Caravan.—[Page 148]

certain trees in the country bore fruit producing living birds.

The karroo was reached while still it was lovely in its verdure. Gnus, with their pointed hoofs, caamas, elks, chamois, and gazelles abounded. Sir John could not resist the temptation to obtain two days' leave from the Colonel, which he devoted with all his energy to his favourite pastime. Under the guidance of the bushman, while Emery accompanied as an amateur, he obtained many a success to inscribe in his journal, and many a trophy to carry back to his Highland home. His hand, skilful with the delicate instruments of the survey, was at home still more on his gun ; and his eye, keen to discern the remotest of stars, was quick to detect the merest movement of a gazelle. It was ever with something of self-denial that he laid aside the character of the hunter to resume the duties of the astronomer. The bushman's uneasiness was ere long renewed. On the second day of Sir John's interval of recreation, Mokoum had espied, nearly two miles to the right, a herd of about twenty of the species of antelope known as the oryx. He told Sir John at once, and advised him to take advantage of the fortune that awaited him, adding that the oryx was extremely difficult to capture, and could outstrip the fleetest horse, and that Cumming himself had not brought down more than four.

This was more than enough to arouse the Englishman.

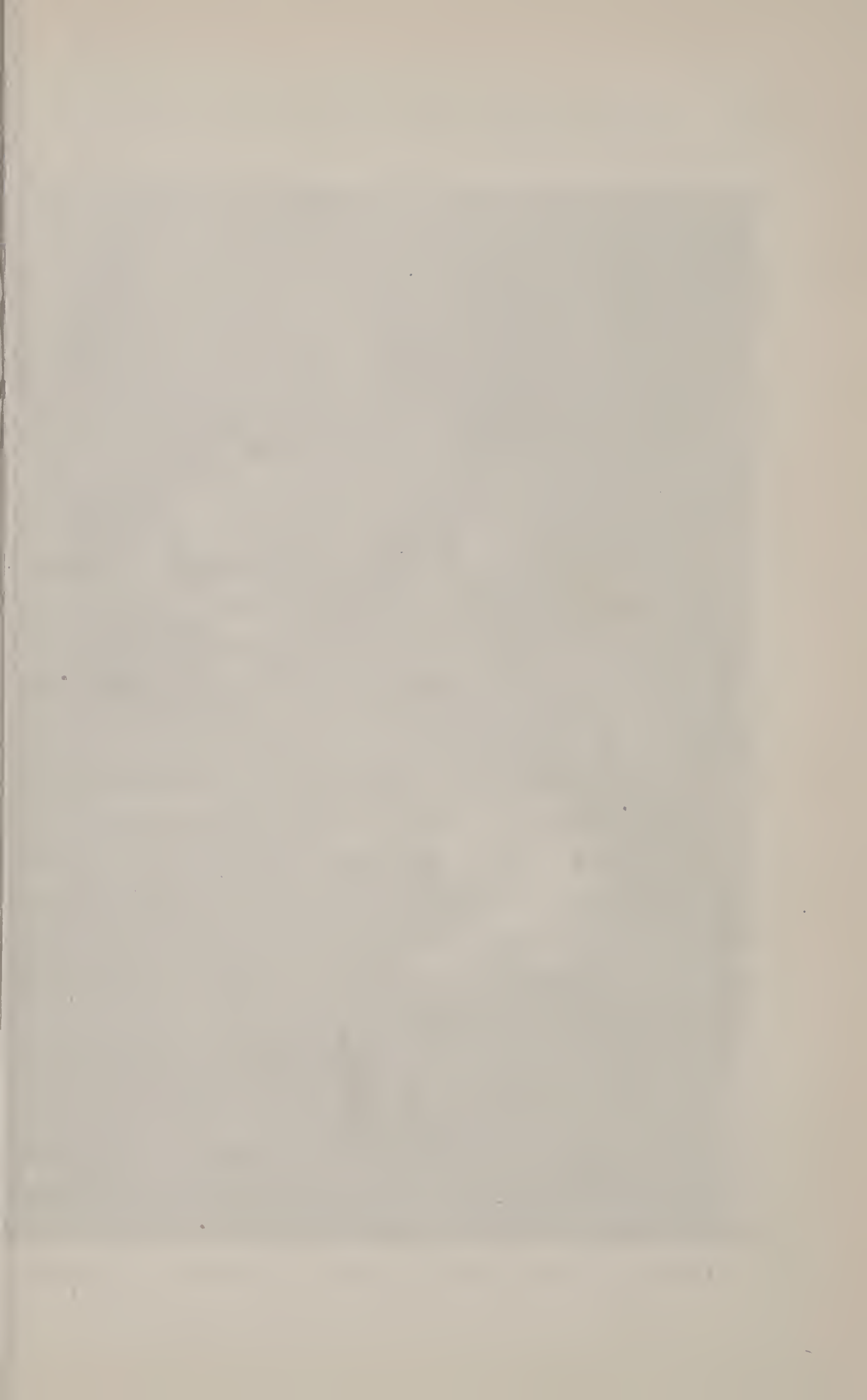
He chose his best gun, his best horse, and his best dogs, and, in his impatience preceding the bushman, he turned towards the copse bordering the plain where the antelopes had been seen. In an hour they reined in their horses, and Mokoum, concealed by a grove of sycamores, pointed out to his companion the herd grazing several hundred paces to leeward. He remarked that one oryx kept apart.

"He is a sentinel," he said, "and doubtless cunning enough. At the slightest danger, he will give his signal, and the whole troop will make their escape. We must fire from a long distance, and hit at the first shot."

Sir John nodded in reply, and sought for a favourable position.

The oryxes continued quietly grazing. The sentinel, as though the breeze had brought suspicions of danger, often raised his head, and looked warily around. But he was too far away for the hunters to fire at him with success, and to chase the herd over the plain was out of the question. The only hope of a lucky issue was that the herd might approach the copse.

Fortune seemed propitious. Gradually following the lead of the sentinel male, the herd drew near the wood, their instinct, perchance, making them aware that it was safer than the plain. When their direction was seen, the bushman asked his companion to dismount. The horses were tied





The Hunters glided through the Creepers and Brushwood.—[Page 151.]

to a sycamore, and their heads covered to secure them from taking alarm.

Followed by the dogs, the hunters glided through the creepers and brushwood till they were within three hundred paces of the troop. Then, crouching in ambush, and waiting with loaded guns, they could admire the beauty of the animals. By a strange freak of nature, the females were armed with horns more formidable than those of the males. The whole herd approached the wood, and awhile remained stationary. The sentinel oryx, as it seemed, was urging them to leave the plain; he appeared to be driving them, something like a sheep-collie congregates a flock, into a compact mass. The herd seemed strangely indifferent, and indisposed to submit to the guidance of their leader. The bushman was perplexed; he could not understand the relative movements of the sentinel and the herd.

Sir John began to get impatient. He fidgeted with his rifle, sometimes wanting to fire, sometimes to advance; and the bushman had some trouble to restrain him. An hour passed away in this manner, when suddenly one of the dogs gave a loud bark, and rushed towards the plain. The bushman felt angry enough to send a ball into the excited brute. The oryxes fled, and Sir John saw at once that pursuit was useless; in a few seconds they were no more than black specks in the grass. But to the bushman's astonishment it was not the old male which had given the signal for flight.

The oryx remained in its place, without attempting to follow, and only tried to hide in the grass.

“Strange,” said the bushman; “what ails the creature? Is he hurt, or crippled with age?”

“We shall soon see,” said Sir John, advancing towards the animal.

The oryx crouched more and more in the grass; only the tips of his long horns were visible above the surface; but as he did not try to escape, Sir John could easily get near him. When within a hundred paces he took aim, and fired. The ball had struck the head, for the horns sunk into the grass. The hunters ran hastily to the spot. The bushman held in his hand his hunting-knife, in case the animal should still live. This precaution was unnecessary; the oryx was so dead, that when Sir John took hold of the horns, he pulled nothing but an empty flabby skin, containing not so much as a bone.

“By St. Andrew! these things happen to no one but me,” he cried, in a tone so comical that any one but the immovable Mokoum would have laughed outright. But Mokoum did not even smile. His compressed lips and contracted brow showed him to be utterly bewildered. With his arms crossed, he looked quickly right and left.

Suddenly he caught sight of a little red leather bag, ornamented with arabesques, on the ground, which he picked up and examined carefully.



The empty Oryx Skin. — [Page 152.]

"What's that?" asked Sir John.

"A Makololo's pouch," replied Mokoum.

"How did it get there?"

"The owner let it fall as he fled."

"What do you mean?"

"I mean," said Mokoum, clenching his fists, "that the Makololo was in the oryx skin, and you have missed him."

Sir John had not time to express his astonishment, when Mokoum, observing a movement in the distance, with all speed seized his gun and fired.

He and Sir John hastened to the suspected spot. But the place was empty: they could perceive by the trampled grass that some one had just been there; but the Makololo was gone, and it was useless to think of pursuit across the prairie.

The two hunters returned, much discomposed. The presence of a Makololo at the cromlech, together with his disguise, not unfrequently adopted by oryx hunters, showed that he had systematically followed the caravan. It was not without design that he was keeping watch upon the Europeans and their escort. The more they advanced to the north, the greater danger there would be of being attacked by the plunderers.

Emery was inclined to banter Sir John on his return from his holiday without booty; but Sir John replied,—

"I hadn't a chance, William; the first oryx I hunted was dead before I shot at him."

CHAPTER XVII.

AN UNEXPECTED BLIGHT.

AFTER the oryx hunt the bushman had a long conversation with the Colonel. He felt sure, he said, that they were watched and followed, and that the only reason why they had not been attacked before was because the Makololos wished to get them farther north, where their hordes were larger. The question thus arose whether, in presence of this danger, they should retrace their steps; but they were reluctant to suffer that which nature had favoured to be interrupted by the attacks of a few African savages. The Colonel, aware of the importance of the question, asked the bushman to tell him all he knew about the Makololos.

Mokoum explained that they were the most northerly branch of the great tribe of the Bechuanas. In 1850 Dr. Livingstone, during his first journey to the Zambesi, was received at Sesheki, the usual residence of Sebitouani, the chief of the Makololos. This native was a man of remarkable intelligence, and a formidable warrior. In 1824 he had menaced the Cape frontier, and, little by little, had

gained an ascendancy over the tribes of Central Africa, and had united them in a compact group. In the year before the arrival of the Anglo-Russian expedition the chief had died in Livingstone's arms, and his son Sekeleton succeeded him.

At first Sekeleton was very friendly towards the Europeans who visited the Zambesi, and Dr. Livingstone had no complaint to make. But after the departure of the famous traveller, not only strangers but the neighbouring tribes were harassed by Sekeleton and his warriors. To these vexations succeeded pillage on a large scale, and the Makololos scoured the district between Lake Ngami and the Upper Zambesi. Consequently nothing was more dangerous than for a caravan to venture across this region without a considerable escort, especially when its progress had been previously known.

Such was the history given by Mokoum. He said that he thought it right to tell the Colonel the whole truth, adding, that for his own part (if the Colonel so wished) he should not hesitate to continue the march.

Colonel Everest consulted with his colleagues, and it was settled that the work, at all risks, should be continued. Something more than half of the project was now accomplished, and, whatever happened, the English owed it to themselves and their country not to abandon their undertaking. The series of triangles was resumed. On the 27th the tropic

of Capricorn was passed, and on the 3rd of November, with the completion of the forty-first triangle, a fifth degree was added to the meridian.

For a month the survey went on rapidly, without meeting a single natural obstacle. Mokoum, always on the alert, kept a constant look-out at the head and flanks of the caravan, and forbade the hunters to venture too great a distance away. No immediate danger, however, seemed to threaten the little troop, and they were sanguine that the bushman's fears might prove groundless. There was no further trace of the native who, after eluding them at the cromlech, had taken so strange a part in the oryx chase: nor did any other aggressor appear. Still, at various intervals, the bushman observed signs of trepidation among the Bochjesmen under his command. The incidents of the flight from the old cromlech, and the stratagem of the oryx hunt, could not be concealed from them, and they were perpetually expecting an attack. A deadly antipathy existed between tribe and tribe, and, in the event of a collision, the defeated party could entertain no hope of mercy. The Bochjesmen were already 300 miles from their home, and there was every prospect of their being carried 200 more. It is true that, before engaging them, Mokoum had been careful to inform them of the length and difficulties of the journey, and they were not men to shrink from fatigue; but now, when to these was added the danger of

a conflict with implacable enemies, regret was mingled with murmuring, and dissatisfaction was exhibited with ill-humour, and although Mokoum pretended neither to hear nor to see, he was silently conscious of an increasing anxiety.

On the 2nd of December a circumstance occurred which still further increased the spirit of complaint amongst this superstitious people, and provoked them to a kind of rebellion. Since the previous evening the weather had become dull. The atmosphere, saturated with vapour, gave signs of being heavily charged with electric fluid. There was every prospect of the recurrence of one of the storms which in this tropical district are seldom otherwise than violent. During the morning the sky became covered with sinister-looking clouds, piled together like bales of down of contrasted colours, the yellowish hue distinctly relieving the masses of dark grey. The sun was wan, the heat was overpowering, and the barometer fell rapidly; the air was so still that not a leaf fluttered.

Although the astronomers had not been unconscious of the change of weather, they had not thought it necessary to suspend their labours. Emery, attended by two sailors and four natives in charge of a waggon, was sent two miles east of the meridian to establish a post for the vertex of the next triangle. He was occupied in securing his point of sight, when a current of cold air caused a rapid condensa-

tion, which appeared to contribute immediately to a development of electric matter. Instantly there fell a violent shower of hail, and by a rare phenomenon the hailstones were luminous, so that it seemed to be raining drops of boiling silver. The storm increased ; sparks flashed from the ground, and jets of light gleamed from the iron settings of the waggon. Dr. Livingstone relates that he has seen tiles broken, and horses and antelopes killed, by the violence of these hail-storms.

Without losing a moment, Emery left his work for the purpose of calling his men to the waggon, which would afford better shelter than a tree. But he had hardly left the top of the hill, when a dazzling flash, instantly followed by a peal of thunder, inflamed the air.

Emery was thrown down, and lay prostrate, as though he were actually dead. The two sailors, dazzled for a moment, were not long in rushing towards him, and were relieved to find that the thunderbolt had spared him. He had been enveloped by the fluid, which, collected by the compass which he held in his hand, had been diverted in its course, so as to leave him not seriously injured. Raised by the sailors, he soon came to himself ; but he had narrowly escaped. Two natives, twenty paces apart, lay lifeless at the foot of the post. One had been struck by the full force of the thunderbolt, and was a black and shattered corpse, while his clothes remained entire ; the other had



Emery and two Natives struck by Lightning. —[Page 158.]

been locally struck on the skull by the destructive fluid, and had been killed at once. The three men had been undeniably struck by a single flash. This trisection of a flash of lightning is an unusual but not unknown occurrence, and the angular division was very large. The Bochjesmen were at first overwhelmed by the sudden death of their comrades, but soon, in spite of the cries of the sailors and at the risk of being struck themselves, they rushed back to the camp. The two sailors, having first provided for the protection of Emery, conveyed the two dead bodies to the waggon, and then found shelter for themselves, being sorely bruised by the hailstones, which fell like a shower of marbles. For three quarters of an hour the storm continued to rage; the hail then abated so as to allow the waggon to return to camp.

The news of the death of the natives had preceded them, and had produced a deplorable effect on the minds of the Bochjesmen, who already looked upon the trigonometrical operations with the terror of superstition. They assembled in secret council, and some more timid than the rest declared they would go no farther. The rebellious disposition began to look serious, and it took all the bushman's influence to arrest an actual revolt. Colonel Everest offered the poor men an increase of pay; but contentment was not to be restored without much trouble. It was a matter of emergency; had the natives deserted, the position of the

caravan, without escort and without drivers, would have been perilous in the extreme. At length, however, the difficulty was overcome, and after the burial of the natives, the camp was raised, and the little troop proceeded to the hill where the two had met their death.

Emery felt the shock for some days : his left hand, which had held the compass, was almost paralyzed ; but after a time it recovered, and he was able to resume his work.

For eighteen days no special incident occurred. The Makololos did not appear, and Mokoum, though still distrustful, exhibited fewer indications of alarm. They were not more than fifty miles from the desert ; and the karroo was still verdant, and enriched by abundant water. They thought that neither man nor beast could want for any thing in this region so rich in game and pasturage ; but they had reckoned without the locusts, against whose appearance there is no security in the agricultural districts of South Africa.

On the evening of the 20th, about an hour before sunset the camp was arranged for the night. A light northerly breeze refreshed the atmosphere. The three Englishmen and Mokoum, resting at the foot of a tree, discussed their plans for the future. It was arranged that during the night the astronomers should take the altitude of some stars, in order accurately to find their latitude. Every thing seemed favourable for the operations ; in a cloudless sky the moon



A strange Cloud.—[Page 161.]

was nearly new, and the constellations might be expected to be clear and resplendent. Great was the disappointment, therefore, when Emery, rising and pointing to the north, said,—

“The horizon is overcast: I begin to fear our anticipations of a fine night will hardly be verified.”

“Yes,” replied Sir John, “I see a cloud is rising, and if the wind should freshen, it might overspread the sky.”

“There is not another storm coming, I hope,” interposed the Colonel.

“We are in the tropics,” said Emery, “and it would not be surprising; for to-night I begin to have misgivings about our observations.”

“What is your opinion, Mokoum?” asked the Colonel of the bushman.

Mokoum looked attentively towards the north. The cloud was bounded by a long clear curve, as definite as though traced by a pair of compasses. It marked off a section of some miles on the horizon, and its appearance, black as smoke, seemed to excite the apprehensions of the bushman. At times it reflected a reddish light from the setting sun, as though it were rather a solid mass than any collection of vapour. Without direct reply to the Colonel’s appeal, Mokoum simply said that it was strange.

In a few minutes one of the Bochjesmen announced that

the horses and cattle showed signs of agitation, and would not be driven to the interior of the camp.

“Well, let them stay outside,” said Mokoum ; and in answer to the suggestion that there would be danger from the wild beasts around, he added significantly, “Oh, the wild beasts will be too much occupied to pay any attention to them.”

After the native had gone back, Colonel Everest turned to ask what the bushman meant ; but he had moved away, and was absorbed in watching the advance of the cloud, of which, too accurately, he was aware of the origin.

The dark mass approached. It hung low and appeared to be but a few hundred feet from the ground. Mingling with the sound of the wind was heard a peculiar rustling, which seemed to proceed from the cloud itself. At this moment, above the cloud against the sky, appeared thousands of black specks, fluttering up and down, plunging in and out, and breaking the distinctness of the outline.

“What are those moving specks of black?” asked Sir John.

“They are vultures, eagles, falcons, and kites,” answered Mokoum, “from afar they have followed the cloud, and will never leave it until it is destroyed or dispersed.”

“But the cloud?”

“Is not a cloud at all,” answered the bushman, extending his hand towards the sombre mass, which by this time had

spread over a quarter of the sky. "It is a living host; to say the truth, it is a swarm of locusts."

The hunter was not mistaken. The Europeans were about to witness one of those terrible invasions of grasshoppers which are unhappily too frequent, and in one night change the most fertile country into an arid desert. These locusts, now arriving by millions, were the "*grylli devastorii*" of the naturalists, and travellers have seen for a distance of fifty miles the beach covered with piles of these insects to the height of four feet.

"Yes," continued the bushman, "these living clouds are a true scourge to the country, and it will be lucky if we escape without harm."

"But we have no crops and pasturages of our own," said the Colonel; "what have we to fear?"

"Nothing, if they merely pass over our heads; every thing, if they settle on the country over which we must travel. They will not leave a leaf on the trees, nor a blade of grass on the ground; and you forget, Colonel, that if our own sustenance is secure, that of our animals is not. What do you suppose will become of us in the middle of a devastated district?"

The astronomers were silent for a time, and contemplated the animated mass before them. The cries of the eagles and falcons, who were devouring the insects by thousands, sounded above the redoubled murmur.

“Do you think they will settle here?” said Emery.

“I fear so,” answered Mokoum, “the wind carries them here direct. The sun is setting, and the fresh evening breeze will bear them down; should they settle on the trees, bushes, and prairies, why, then I tell you——;” but the bushman could not finish his sentence. In an instant the enormous cloud which overshadowed them settled on the ground. Nothing could be seen as far as the horizon but the thickening mass. The camp was bestrewed; wag-gons and tents alike were veiled beneath the living hail. The Englishmen, moving knee-deep in the insects, crushed them by hundreds at every step.

Although there was no lack of agencies at work for their destruction, their aggregate defied all check. The birds, with hoarse cries, darted down from above, and devoured them greedily; from below, the snakes consumed them in enormous quantities; the horses, buffaloes, mules, and dogs fed on them with great relish; and lions and hyenas, elephants and rhinoceroses, swallowed them down by bushels. The very Bochjesmen welcomed these “shrimps of the air” like celestial manna; the insects even preyed on each other, but their numbers still resisted all sources of destruction.

The bushman entreated the English to taste the dainty. Thousands of young locusts, of a green colour, an inch to an inch and a half long, and about as thick as a quill, were

caught. Before they have deposited their eggs, they are considered a great delicacy by connoisseurs, and are more tender than the old insects, which are of a yellowish tinge, and sometimes measure four inches in length. After half an hour's boiling and seasoning with salt, pepper, and vinegar, the bushman served up a tempting dish to the three Englishmen. The insects, dismembered of head, legs, and skin, were eaten just like shrimps, and were found extremely savoury. Sir John, who ate some hundreds, recommended his people to take advantage of the opportunity to make a large provision.

At night they were all about to seek their usual beds ; but the interior of the waggons had not escaped the invasion. It was impossible to enter without crushing the locusts, and to sleep under such conditions was not an agreeable prospect. Accordingly, as the night was clear and the stars bright, the astronomers were rejoiced to pursue their contemplated operations, and deemed it more pleasant than burying themselves to the neck in a coverlet of locusts. Moreover, they would not have had a moment's sleep, on account of the howling of the beasts which were attracted by their unusual prey.

The next day the sun rose in a clear horizon, and commenced its course over a brilliant sky foreboding heat. A dull rustling of scales among the locusts showed that they were about to carry their devastations elsewhere ; and

towards eight o'clock the mass rose like the unfurling of an immense veil, and obscured the sun. It grew dusk as if night were returning, and with the freshening of the wind the whole mass was in motion. For two hours, with a deafening noise, the cloud passed over the darkened camp, and disappeared beyond the western horizon.

After their departure the bushman's predictions were found to be entirely realized. All was demolished, and the soil was brown and bare. Every branch was stripped to utter nakedness. It was like a sudden winter settling in the height of summer, or like the dropping of a desert into the midst of a land of plenty. The Oriental proverb which describes the devastating fury of the Osmanlis might justly be applied to these locusts, "Where the Turk has passed, the grass springs up no more."

CHAPTER XVIII.

THE DESERT.

IT was indeed no better than a desert which now lay before the travellers. When, on the 25th of December, they completed the measurement of another degree, and reached the northern boundary of the karroo, they found no difference between the district they had been traversing and the new country, the real desert, arid and scorching, over which they were now about to pass. The animals belonging to the caravan suffered greatly from the dearth alike of pasturage and water. The last drops of rain in the pools had dried up, and it was an acrid soil, a mixture of clay and sand, very unfavourable to vegetation. The waters of the rainy season filtered quickly through the sandy strata, so that the region was incapable of preserving for any length of time a particle of moisture. More than once has Dr. Livingstone carried his adventurous explorations across one of these barren districts. The very atmosphere was so dry, that iron left in the open air did not rust,

and the distinguished traveller relates that the leaves hung weak and shrivelled ; that the mimosas remained closed by day as well as by night ; that the scarabæi, laid on the ground, expired in a few seconds ; and that the mercury in the ball of a thermometer buried three inches in the soil rose at midday to 134° Fahrenheit.

These records which Livingstone had made were now verified by the astronomers between the karroo and Lake Ngami. The suffering and fatigue, especially of the animals, continually increased, and the dry dusty grass afforded them but little nourishment. Nothing ventured on the desert ; the birds had flown beyond the Zambesi for fruit and flowers, and the wild beasts shunned the plain which offered them no prey. During the first fortnight in January the hunters caught sight of a few couples of those antelopes which are able to exist without water for several weeks. There were some oryxes like those in whose pursuit Sir John had sustained so great a disappointment, and there were besides, some dappled, soft-eyed caamas, which venture beyond the green pasturages, and which are much esteemed for the quality of their flesh.

To travel under that burning sun through the stifling atmosphere, to work for days and nights in the oppressive sultriness, was fatiguing in the extreme. The reserve of water evaporated continuously, so they were obliged to ration themselves to a painfully limited allowance. How-



Crossing the Desert.—[Page 169.]

ever, such were their zeal and courage that they mastered all their troubles, and not a single detail of their task was neglected. On the 25th of January they completed their seventh degree, the number of triangles constructed having amounted to fifty-seven.

Only a comparatively small portion of the desert had now to be traversed, and the bushman thought that they would be able to reach Lake Ngami before their provision was exhausted. The Colonel and his companions thus had definite hopes, and were inspirited to persevere. But the hired Bochesmen, who knew nothing of any scientific ardour, and who had been long ago reluctant to pursue their journey, could hardly be encouraged to hold out: unquestionably they suffered greatly, and were objects for commiseration. Already, too, some beasts of burden, overcome by hard work and scanty food, had been left behind, and it was to be feared that more would fall into the same helpless condition. Mokoum had a difficult task to perform, and as murmurs and recriminations increased, his influence more and more lost its weight. It became evident that the want of water would be a serious obstacle, and that the expedition must either retrace its steps, or, at the risk of meeting the Russians, turn to the right of the meridian, to seek some of the villages which were known to be scattered along Livingstone's route.

It was not long, however, before the bushman one morn-

ing came to the Colonel, and declared himself powerless against the increasing difficulties. The drivers, he said, refused to obey him ; and there were continued scenes of insubordination, in which all the natives joined. The Colonel perfectly well understood the situation ; but stern to himself, he was stern to others. He refused to suspend his operations, and declared that although he went alone, he would continue to advance. His two companions of course agreed, and professed themselves ready to follow him. Renewed efforts of Mokoum persuaded the natives to venture a little farther : he felt sure that the caravan could not be more than five or six days' march from Lake Ngami, and once there, the animals could find pasturage and shade, and the men an abundance of fresh water. All these considerations he laid before the principal Bochjesmen. He showed them that it was really best to advance northwards. If they turned to the west, their march would be perilous, and to turn back was only to find the karroo, desolate and dry. The natives at length yielded to his solicitations, and the almost exhausted caravan continued its course.

Happily this vast plain was in itself favourable to all astronomical observations, so that no delay arose from any natural obstruction. On one occasion there sprang up a sudden hope that nature was about to restore to them a supply of the water of which she had been so niggardly. A

lagoon, a mile or two in extent, was discovered on the horizon. The reflection was indubitably of water, proving that what they saw was no mirage, due to the unequal density of the atmospheric strata. The caravan speedily turned in that direction, and the lagoon was reached towards five in the evening. Some of the horses broke away from their drivers, and galloped to the longed-for water. Having smelt it, they plunged in to their chests, but almost immediately returned to the bank. They had not drunk, and when the Bochjesmen arrived they found themselves by the side of a lagoon so impregnated with salt that its water could not be touched. Disappointment was keen, it was little short of despair. Mokoum thought that he should never induce the natives to proceed; but fortunately the only hope was in advancing, and even the natives were alive to the conviction that Lake Ngami was the nearest point where water could be procured. In four days, unless retarded by its labours, the expedition must reach the shores of the lake.

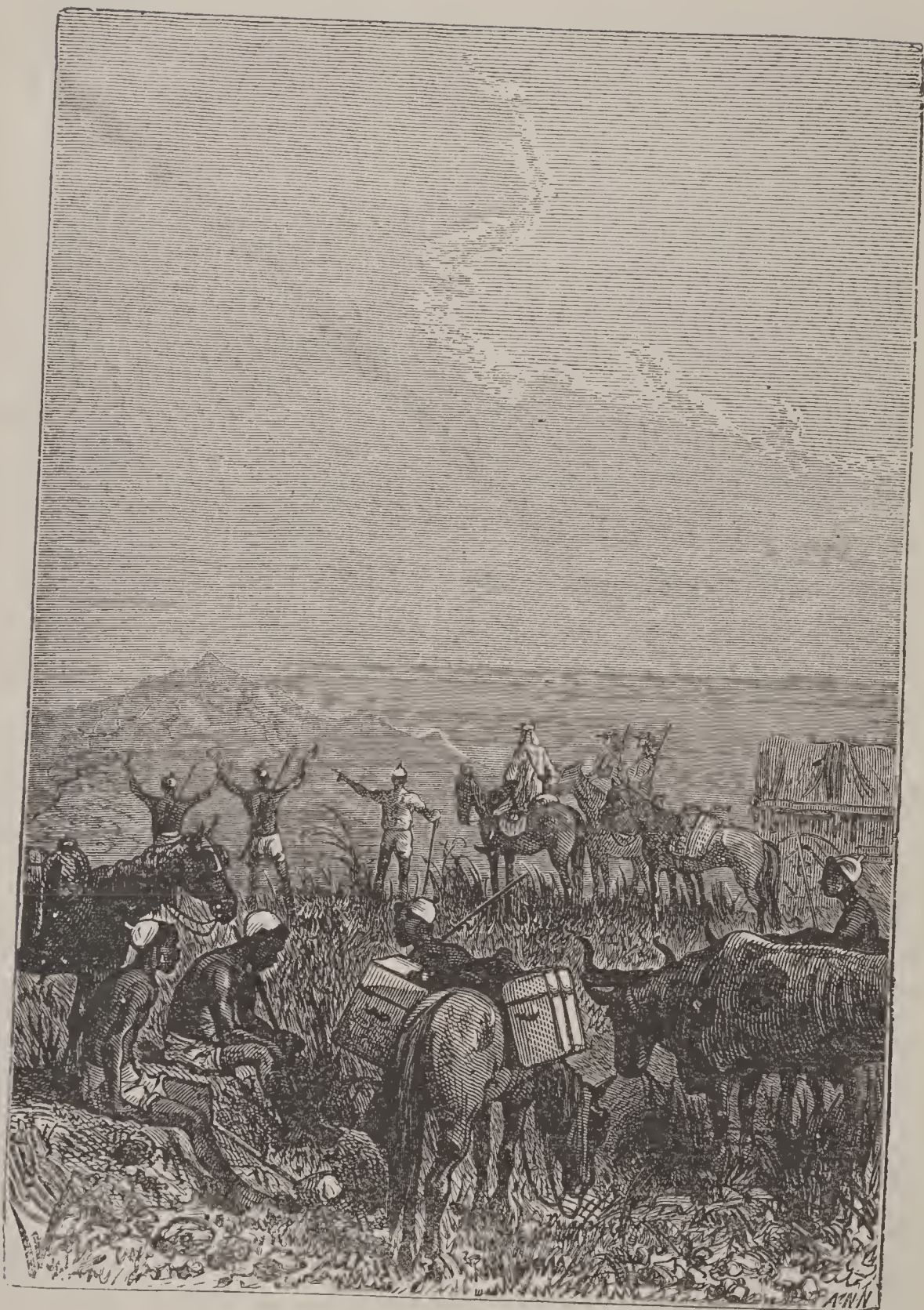
Every day was momentous. To economize time, Colonel Everest formed larger triangles and established fewer posts. No efforts were spared to hurry on the progress of the survey. Notwithstanding the application of every energy, the painful sojourn in the desert was prolonged, and it was not until the 21st of February that the level ground began to be rough and undulating. A mountain 500 or 600 feet

high was descried about fifteen miles to the north-west. The bushman recognized it as Mount Scorzef, and, pointing to the north, said,—

“Lake Ngami is there.”

“The Ngami! the Ngami!” echoed the natives, with noisy demonstration. They wished to hurry on in advance over the fifteen miles, but Mokoum restrained them, asserting that the country was infested by Makololos, and that it was important to keep together. Colonel Everest, himself eager to reach the lake, resolved to connect by a single triangle the station he was now occupying with Mount Scorzef. The instruments were therefore arranged, and the angle of the last triangle which had been already measured from the south was measured again from the station. Mokoum, in his impatience, only established a temporary camp; he hoped to reach the lake before night; but he neglected none of his usual precautions, and prudently sent out horsemen right and left to explore the underwood. Since the oryx-chase the Makololos seemed indeed to have abandoned their watch, still he would not incur any risk of being taken by surprise.

Thus carefully guarded by the bushman, the astronomers constructed their triangle. According to Emery's calculations it would carry them nearly to the twentieth parallel, the proposed limit of their arc. A few more triangles on the other side of Lake Ngami would complete their eighth degree; to verify the calculations, a new base would



“The Ngami ! the Ngami !”—[Page 172.]

subsequently be measured directly on the ground, and the great enterprise would be ended. The ardour of the astronomers increased as they approached the fulfilment of their task.

Meanwhile there was considerable curiosity as to what the Russians on their side had accomplished. For six months the members of the commission had been separated, and it seemed probable to the English that the Russians had not suffered so much from heat and thirst, since their course had lain nearer Livingstone's route, and therefore in less arid regions. After leaving Kolobeng they would come across various villages to the right of their meridian, where they could easily revictual their caravan. But still it was not unlikely that in this less arid, though more frequented country, Matthew Strux's little band had been more exposed to the attacks of the plundering Makololos, and this was the more probable, since they seemed to have abandoned the pursuit of the English caravan.

Although the Colonel, ever engrossed, had no thought to bestow on these things, Sir John and Emery had often discussed the doings of their former comrades. They wondered whether they would come across them again, and whether they would find that they had obtained the same mathematical result as themselves, and whether the two computations of a degree in South Africa would be identical. Emery did not cease to entertain kind memories

of his friend, knowing well that Zorn, for his part, would never forget him.

The measurement of the angles was now resumed. To obtain the angle at the station they now occupied, they had to observe two points of sight. One of these was formed by the conical summit of Mount Scorzef, and the other by a sharp peak three or four miles to the left of the meridian, whose direction was easily obtained by one of the telescopes of the repeating circle. Mount Scorzef was much more distant; its position would compel the observers to diverge considerably to the right of the meridian, but on examination they found they had no other choice. The station was therefore observed with the second telescope of the repeating circle, and the angular distance between Mount Scorzef and the smaller peak was obtained.

Notwithstanding the impatience of the natives, Colonel Everest, as calmly as though he were in his own observatory, made many successive registries from the graduated circle of his telescope, and then, by taking the average of all his readings, he obtained a result rigorously exact.

The day glided on, and it was not until the darkness prevented the reading of the instruments, that the Colonel brought his observations to an end, saying,—

“I am at your orders, Mokoum; we will start as soon as you like.”

"And none too soon," replied Mokoum; "better had we accomplished our journey by daylight."

The proposal to start met with unanimous approval, and by seven o'clock the thirsty party were once more on the march.

Some strange foreboding seemed weighing on the mind of Mokoum, and he urged the three Europeans to look carefully to their rifles and to be well provided with ammunition. The night grew dark, the moon and stars were repeatedly veiled in mist, but the atmosphere near the ground was clear. The bushman's keen vision was ever watching the flanks and front of the caravan, and his unwonted disquietude could not fail to be noticed by Sir John, who was likewise on the watch. They toiled through the weary evening, occasionally stopping to gather together the loiterers, and at ten o'clock they were still six miles from the lake. The animals gasped for breath in an atmosphere so dry that the hygrometer could not have detected a trace of moisture.

Mokoum was indefatigable in his endeavours to keep the disorganized party close together; but, in spite of his remonstrances, the caravan no longer presented a compact nucleus. Men and beasts stretched out into a long file, and some oxen had sunk exhausted to the ground. The dismounted horsemen could hardly drag themselves along, and any stragglers could have been easily carried off by

the smallest band of natives. Mokoum went in evident anxiety from one to another, and with word and gestures tried to rally the troop ; but his success was far from complete, and already, without his knowledge, some of his men were missing.

By eleven o'clock the foremost waggons were hardly more than three miles from their destination. In the gloom of night Mount Scorzef stood out distinctly in its solitary height, like an enormous pyramid, and the obscurity made its dimensions appear greater than they actually were. Unless Mokoum were mistaken, Lake Ngami lay just behind Mount Scorzef, so that the caravan must pass round its base in order to reach the tract of fresh water by the shortest route.

The bushman, in company with the three Europeans, took the lead, and prepared to turn to the left, when suddenly some distinct, though distant reports, arrested their attention. They reined in their horses, and listened with a natural anxiety. In a country where the natives use only lances and arrows the report of European fire-arms was rather startling. The Colonel and Sir John simultaneously asked the bushman from whence the sound could proceed. Mokoum asserted that he could perceive a light in the shadow at the summit of Mount Scorzef, and that he had no doubt that the Makololos were attacking a party of Europeans.

"Europeans!" cried Emery.

"Yes," replied Mokoum; "these reports can only be produced by European weapons."

"But what Europeans could they be?" began Sir John.

"Be who they may," broke in the Colonel, "we must go to their assistance."

"Yes; come on," said Emery, with no little excitement.

Before setting off for the mountain, Mokoum, for the last time, tried to rally the small band. But when the bushman turned round the caravan was dispersed, the horses unyoked, the waggons forsaken, and a few scattered shadows were flying along the plain towards the south.

"The cowards!" he cried; then turning to the English, he said, "Well, we must go on."

The Englishmen and the bushman, gathering up all the remaining strength of their horses, darted on to the north. After a while they could plainly distinguish the war-cry of the Makololos. Whatever was their number, it was evident they were making an attack on Mount Scorzei, from the summit of which the flashes of fire continued. Groups of men could be faintly distinguished ascending the sides. Soon the Colonel and his companions were on the rear of the besiegers. Abandoning their worn-out steeds, and shouting loud enough to be heard by the besieged, they fired at the mass of natives. The rapidity with which they re-loaded caused the Makololos to imagine

themselves assailed by a large troop. The sudden attack surprised them, and, letting fly a shower of arrows and assagais, they retreated. Without losing a moment, the Colonel, Sir John, Emery, the bushman, and the sailors, never desisting from firing, darted among the group of natives, of whose bodies no less than fifteen soon strewed the ground.

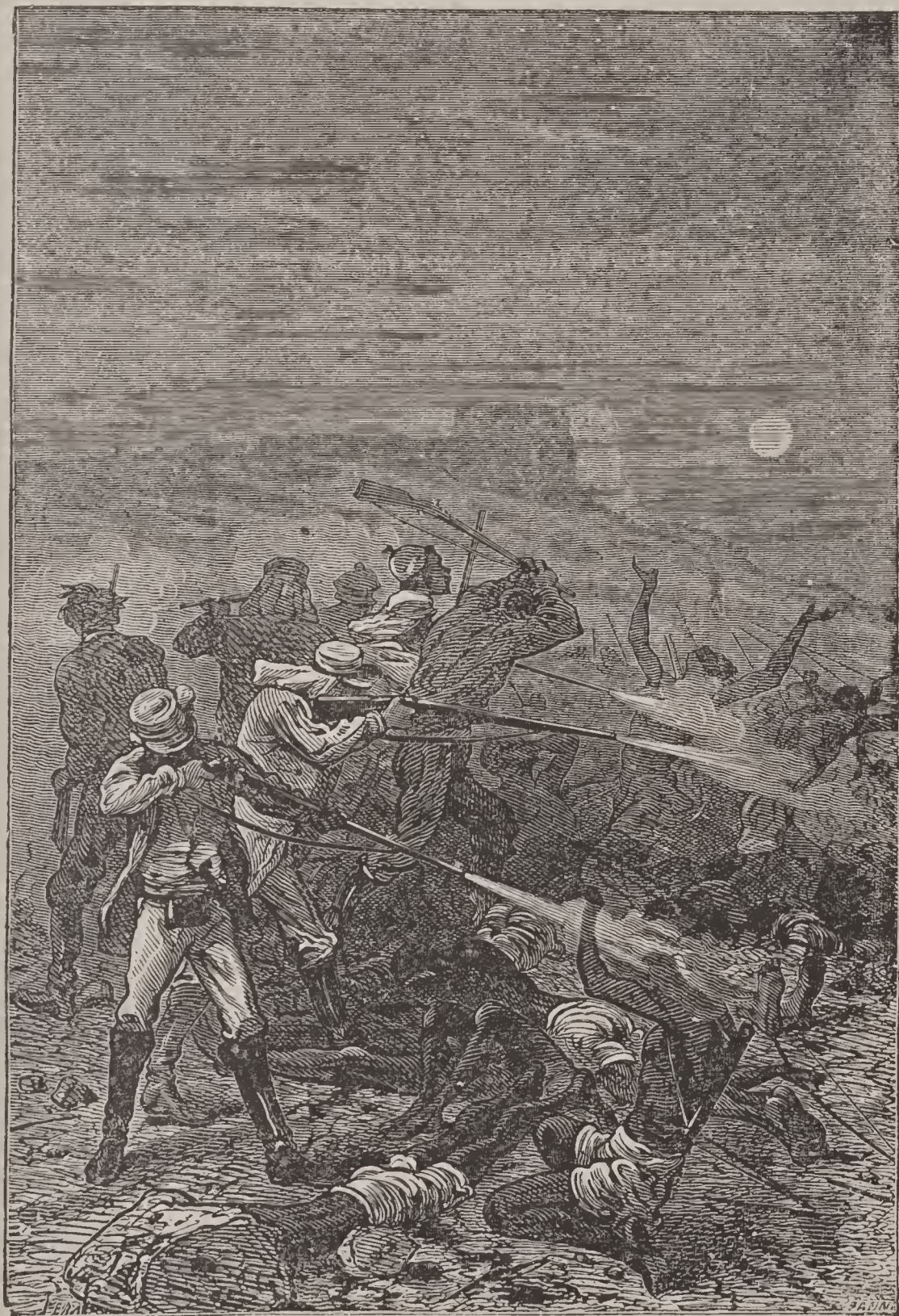
The Makololos divided. The Europeans rushed into the gap, and, overpowering the foremost, ascended the slope backwards. In a few minutes they had reached the summit, which was now entirely in darkness, the besieged having suspended their fire for fear of injuring those who had come so opportunely to their aid.

They were the Russian astronomers. Strux, Palander, Zorn, and their five sailors, all were there : but of all the natives belonging to their caravan there remained but the faithful pioneer. The Bochjesmen had been as faithless to them as they had been to the English.

The instant the Colonel appeared, Strux darted from the top of a low wall that crowned the summit.

“The English !” he cried.

“Yes,” replied the Colonel gravely ; “but now neither Russian nor English. Nationalities be forgotten ; for mutual defence we are kinsmen, in that we are one and all Europeans !”



The English come to the relief of the Russians.—[Page 178.]

CHAPTER XIX.

SCIENCE UNDAUNTED.

NOBLE words were those just uttered by the Colonel. In the face of the Makololos it was no time for hesitation or discussion, and English and Russians, forgetting their national quarrel, were now re-united for mutual defence more firmly than ever. Emery and Zorn had warmly greeted each other, and the others had sealed their new alliance with a grasp of the hand.

The first care of the English was to quench their thirst. Water, drawn from the lake, was plentiful in the Russian camp. Then, as soon as the Makololos were quiet enough to afford some respite, the astronomers, sheltered by a sort of casemate forming part of a deserted fortress, talked of all that had happened since their separation at Kolobeng.

It appeared that the same reason had brought the Russians so far to the left of their meridian as had caused the English to turn to the right of theirs. Mount Scorzeff, halfway between the two arcs, was the only height in that

district which would serve as a station on the banks of Lake Ngami. Each of the meridians crossed the lake, whose opposite shores it was necessary to unite trigonometrically by a large triangle. Naturally, therefore, the two rival expeditions met on the only mountain which could serve their purpose.

Matthew Strux then gave some details of his operations. After leaving Kolobeng, the Russian party had continued without irregularity. The old meridian, which had fallen by lot to the Russians, fell across a fertile and slightly undulated country, which offered every facility for the formation of the triangles. Like the English, they had suffered from the heat, but they had experienced no hardship from the want of water. Streams were abundant, and kept up a wholesome moisture. The horses and oxen had roamed over an immense pasturage, across verdant prairies broken by forests and underwood. The wild animals by night had been safely kept at a distance by sentinels and fires, nor had any natives been seen except those stationary in the villages in which Dr. Livingstone had always found a hospitable reception. All through the journey the Bochjesmen of the caravan had given no cause for complaint, nor was it until the previous day, when the Makololos to the number of 200 or 300 had appeared on the plain, that they had shown themselves faithless, and deserted. For thirty-six hours the expedition had now occupied the little fortress.

The Makololos had attacked them in the evening, after plundering the waggons left at the foot of the hill. The instruments fortunately, having been carried into the fort, were secure. The steamboat had also escaped the ravages of the natives ; it had been immediately put together by the sailors, and was now at anchor in a little creek of Lake Ngami, behind the enormous rocks that formed the base of the mountain. Mount Scorzef sloped with sudden abruptness down to the lake, and there was no danger of an attack from that side.

Such was Matthew Strux's account. Colonel Everest, in his turn, related the incidents of his march, the fatigues and difficulties, and the revolt of the Bochjesmen, and it was found by comparison that the Russians had had a less harassing journey than their rivals.

The night of the 21st passed quietly. The bushman and sailors kept watch under the walls of the fort ; the Makololos on their part did not renew any attack, but the bivouac-fires at the foot of the mountain proved that they had not relinquished their project. At daybreak the Europeans left their casemate for the purpose of reconnoitring the plain. The early morning light illumined the vast extent of country as far as the horizon. Towards the south lay the desert, with its burnt brown grass and barren aspect. Close under the mountain was the circular camp, containing a swarm of 400 to 500 natives. The fires were still alight,

and some pieces of venison broiling on the hot embers. The encampment was something more than temporary ; the Makololos were evidently determined not to abandon their prey. Either vengeance or an instinctive thirst for blood appeared to be prompting them, since all the valuables of both caravans, the waggons, horses, oxen, and provisions, had fallen into their power ; or perhaps it might be that they coveted the fire-arms which the Europeans carried, and of which they made such terrible use. The united English and Russians held a long consultation with the bushman, and it was felt that they could not relax their watch until they should arrive at a definite decision. This decision must depend on a variety of circumstances, and first of all it was necessary to understand exactly the position of Mount Scorzef.

The mountain overlooked to the south, east, and west the vast desert which the astronomers, having traversed it, knew extended southwards to the karroo. In the west could be discerned the faint outlines of the hills bordering the fertile country of the Makololos, one of whose capitals, Maketo, lies about a hundred miles north-west of Lake Ngami. To the north the mountain commanded a country which was a great contrast to the arid steppes of the south. There were water, trees, and pasturage. For a hundred miles east and west lay the wide Lake Ngami, while from north to south its length was not more than 30 to 40 miles.

Beyond appeared a gentle, undulated country, enriched with forests and watered by the affluents of the Zambesi, and shut in to the extreme north by a low chain of mountains. This wide oasis was caused by the great artery, the Zambesi, which is to South Africa what the Danube is to Europe, or the Amazon to South America.

The side of the mountain towards the lake, steep as it was, was not so steep but that the sailors could accomplish an ascent and descent by a narrow way which passed from point to point. They thus contrived to reach the spot where the "Queen and Czar" lay hid, and, obtaining a supply of water, enabled the little garrison to hold out in the deserted fort as long as their provisions lasted.

The astronomers wondered why this little fort had been placed on the top of the mountain. Mokoum, who had visited the country as Livingstone's guide, explained that formerly the neighbourhood of Lake Ngami was frequented by traders in ivory and ebony. The ivory was furnished by the elephants and rhinoceroses; but the ebony trade was but too often another name for that traffic in human beings which is still carried on by the slave-traders in the region of the Zambesi. A great number of prisoners are made in the wars and pillages in the interior of the country, and these prisoners are sold as slaves. Mount Scorzeff had been a centre of encampment for the ivory-traders, and it was there that they had been accustomed to rest before descend-

ing the Zambesi. They had fortified their position, to protect themselves and their slaves from depredations, since it was not an uncommon occurrence for the prisoners to be recaptured for fresh sale by the very men who had recently sold them. The route of the traders was now changed ; they no longer passed the shores of the lake, and the little fort was falling into ruins. All that remained was an enclosure in the form of the sector of a circle, from the centre of which rose a small casemated redoubt, pierced with loop-holes, and surmounted by a small wooden turret.

But notwithstanding the condition of ruin into which it had fallen, the fortress offered the Europeans a welcome retreat. Behind the thick sandstone walls, and armed with their rapidly-loading guns, they were confident that they could keep back an army of Makololos, and, unless their provisions and ammunition failed, they would be able to complete their observations. At present they had plenty of ammunition ; the coffer in which it was contained had been placed on the same waggon which carried the steam-boat, and had therefore escaped the rapacity of the natives. The great difficulty would be the possible failure of provisions. The Colonel and Strux made a careful inspection of the store, and found that there was only enough to last the eighteen men for two days. After a short breakfast, the astronomers and the bushman, leaving the sailors still to

keep watch round the walls, assembled in the redoubt to discuss their situation.

"I cannot understand," said Mokoum, "why you are so uneasy. You say that we have only provisions for two days; but why stay here? Let us leave to-morrow, or even to-day. The Makololos need not hinder us; they could not cross the lake, and in the steamboat we may reach the northern shore in a few hours."

The astronomers looked at each other; the idea, natural as it was, had not struck them before. Sir John was the first to speak.

"But we have not yet completed the measurement of our meridian."

"Will the Makololos have any regard for your meridian?" asked the hunter.

"Very likely not," answered Sir John; "but *we* have a regard for it, and will not leave our undertaking incomplete. I am sure my colleagues agree with me."

"Yes," said the Colonel, speaking for all; "as long as one of us survives, and is able to put his eye to his telescope, the survey shall go on. If necessary, we will take our observations with our instrument in one hand and our gun in the other, even to the last extremity."

The energetic philosophers shouted out their resolution to proceed at every hazard.

When it was thus decided that the survey should at all risks be continued, the question arose as to the choice of the next station.

"Although there will be a difficulty," said Strux, "in joining Mount Scorzeff trigonometrically to a station to the north of the lake, it is not impracticable. I have fixed on a peak in the extreme north-east, so that the side of the triangle will cross the lake obliquely."

"Well," said the Colonel, "if the peak exists, I do not see any difficulty."

"The only difficulty," replied Strux, "consists in the distance."

"What is the distance?"

"Over a hundred miles, and a lighted signal must be carried to the top of the peak."

"Assuredly that can be done," said the Colonel.

"And all that time, how are we to defend ourselves against the Makololos?" asked the bushman.

"We will manage that too."

Mokoum said that he would obey the Colonel's orders, and the conversation ended. The whole party left the casemate, and Strux pointed out the peak he had chosen. It was the conical peak of Volquiria, 300 feet high, and just visible in the horizon. Notwithstanding the distance, a powerful reflector could thence be discerned by means of a magnifying telescope, and the curvature of the

earth's surface, which Strux had taken into account, would not be any obstacle. The real difficulty was how the lamp should be hoisted to the top of the mountain. The angle made at Mount Scorzef with Mount Volquiria and the preceding station would probably complete the measurement of the meridian, so that the operation was all important. Zorn and Emery offered to take this journey of a hundred miles in an unknown country, and, accompanied by the pioneer, prepared to start.

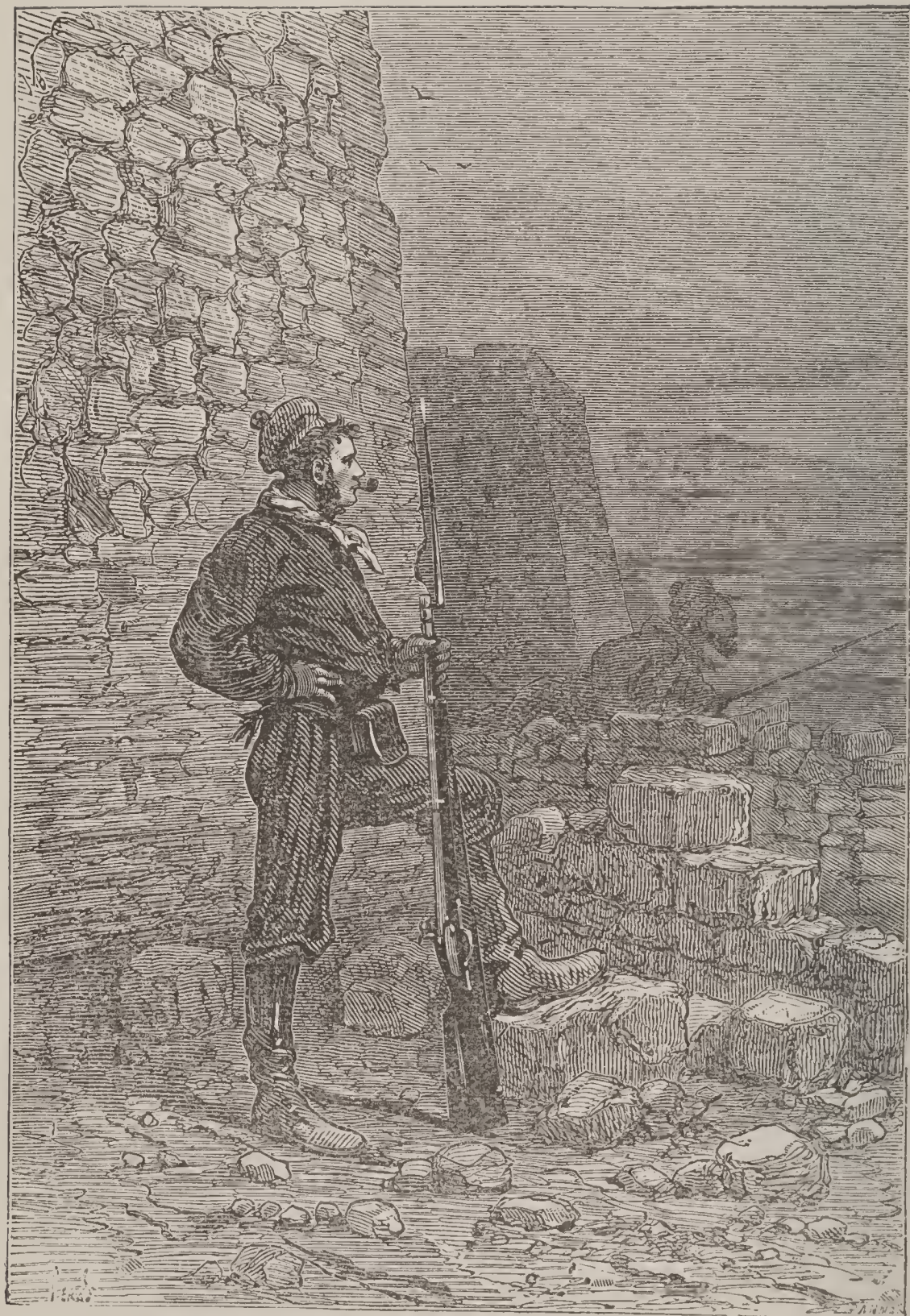
One of the canoes of birch-bark, which are manufactured by the natives with great dexterity, would be sufficient to carry them over the lake. Mokoum and the pioneer descended to the shore, where were growing some dwarf birches, and in a very short time had accomplished their task, and prepared the canoe.

At eight o'clock in the evening the newly-constructed craft was loaded with instruments, the apparatus for the reverberator, provisions, arms, and ammunition. It was arranged that the astronomers should meet again in a small creek known to both Mokoum and the pioneer ; it was also agreed that as soon as the reverberator on Mount Volquiria should be perceived, Colonel Everest should light a signal on Mount Scorzef, so that Emery and Zorn, in their turn, might take the direction.

The young men took leave of their colleagues, and

descended the mountain in the obscurity of night, having been preceded by the pioneer and two sailors, one English and one Russian. The mooring was loosened, and the frail boat turned quietly across the lake.





On Guard on Mount Scorzel. - [Page 189]

CHAPTER XX.

STANDING A SIEGE.

NOT without anxiety had the astronomers witnessed the departure of their young colleagues: they could not tell what dangers awaited them in that unknown country. Mokoum tried to reassure them by praising the courage of the pioneer, and besides, he said, the Makololos were too much occupied around Mount Scorzef to beat the country to the north of Lake Ngami. He instinctively felt that the Colonel and his party were in a more dangerous position than the two young astronomers.

The sailors and Mokoum kept watch in turns through the night. But "the reptiles," as the bushman termed the Makololos, did not venture another attack. They seemed to be waiting for reinforcements, in order to invade the mountain from all sides, and overcome by their numbers the resistance of the besieged.

The hunter was not mistaken in his conjectures; and when daylight appeared Colonel Everest perceived a

sensible increase in the number of the natives. Their camp, carefully arranged round the base of the mountain, shut off escape on every side except that towards the lake. This side could not be invested, so that unless unforeseen circumstances occurred, retreat to the water was always practicable. But the Europeans had no thought of escaping: they occupied a post of honour, and were all agreed that it must not be abandoned. No allusion was ever made to the war between England and Russia, and both parties strove together to accomplish their scientific labour.

The interval of waiting for the signal on Mount Volquiria was employed in completing the measurement of the preceding triangle and in finding the exact latitude of Mount Scorzeff by means of the altitudes of the stars.

Mokoum was called upon to say what would be the shortest possible space of time that must elapse before Emery and Zorn could reach Mount Volquiria. He replied that as the journey was to be performed on foot, and the country was continually crossed by rivers, he did not think that they could arrive in less than five days at least. They therefore adopted a maximum of six days, and portioned out their supplies to serve for that period. Their reserve was very limited, consisting only of a few pounds of biscuit, preserved meat, and pemmican, and had already been diminished by the portion furnished to the pioneer's little troop.

Colonel Everest and his companions, anxiously anticipating the sixth day, decided that the daily ration must be reduced to a third of their previous allowance. The thirteen men would doubtless suffer much from this small amount of nourishment, but there was an unflinching determination to bear up bravely.

"Besides," said Sir John, "we have room enough to hunt."

Mokoum shook his head doubtfully: he thought that game would be rare on the mountain. However, his gun need not be idle, and leaving the astronomers to examine and correct their registers, he set off with Sir John.

The Makololos were quietly encamped, and apparently patient in their intention of reducing the besieged by famine. The two hunters reconnoitred the mountain. The fort occupied a space of ground measuring not more than a quarter of a mile in its widest part. The soil was covered with flints and grass, dotted here and there with low shrubs, and bright with gladioli. Red heaths, silvery-leaved proteæ, and ericæ with wavy fronds, formed the flora of the mountain, and beneath the angles formed by the projections of rock sprung up thorny bushes ten feet high, with bunches of a sweet-smelling white flower. The bushman was ignorant of its name, but it was doubtless the *Arduina bispinosa*, which bears fruit like the barberry.

After an hour's search Sir John had seen no trace of game. Some little birds with dark wings and red beaks flew out of the bushes, but at the first shot they disappeared, no more to return. It was evident that the garrison must not depend on the products of the chase for sustenance.

"We can fish in the lake," said Sir John, standing and contemplating the fine extent of water.

"To fish without net or line," replied the bushman, "is as difficult as to lay hands on birds on the wing. But we will not despair ; chance has hitherto favoured us."

"Chance ! nay, not chance, but Providence," said Sir John. "That does not forsake us ; it has brought us to the Russians, and will no doubt carry us on to our goal."

"And will Providence feed us, Sir John ?" asked the bushman.

"No doubt, Mokoum," said Sir John encouragingly ; and the bushman thought to himself that no blind trust in Providence should prevent him from using his own best exertions.

The 25th brought no change in the relative positions of besiegers and besieged. The Makololos, having brought in the plundered waggons, remained in their camp. Herds and flocks were grazing in the pasturages at the foot of the mountain, and some women and children, who had joined the tribe, went about and pursued their ordinary occupations. From time to time, some chief, recognizable by



An Attack on Mount Scorzef.—[Page 193.]

the richness of the skins which he wore, ascended the slope of the mountain and tried to examine the approaches to the summit ; but the report of a rifle always took him speedily back to the plain. The Makololos then raised their war-cry, brandished their assagais, and all became quiet.

The following day the natives made a more serious attempt, and about fifty of them at once scaled three sides of the mountain. The whole garrison turned out to the foot of the enclosure, and the European arms caused considerable ravage among the Makololos. Five or six were killed, and the rest abandoned their project, but it was quite evident that if several hundred were to assault the mountain simultaneously, the besieged would find it difficult to face them on all sides. Sir John now thought of the mitrailleuse, which was the principal weapon of the "Queen and Czar," and proposed that it should be brought up to defend the front of the fortress. It was a difficult task to hoist the machine up the rocks, which in some parts were almost perpendicular ; but the sailors showed themselves so agile and daring, that in the course of the day the mitrailleuse was installed in the embrasure of the embattled enclosure. Thence, its twenty-five muzzles, arranged in the shape of a fan, would cover the front of the fort, and the natives would thus early make acquaintance with the engine of death which in after-years was to

effect such devastation amongst the civilized armies of the European continent.

The dry air and clear sky had enabled the astronomers each night to pursue their observations. They had found the latitude of Mount Scorzef to be $19^{\circ}, 37'$, which result confirmed their opinion that they were less than half a degree from the northern extremity of their meridian, and that consequently the next triangle would complete the series.

The night passed without any fresh alarm. If circumstances had favoured the pioneer, he and his companions would reach Mount Volquiria the following day, so that the astronomers kept unflagging watch through the next night for the appearance of the light. Strux and the Colonel had already pointed the telescope to the peak, so that it was continuously embraced in the field of the object-glass, otherwise it would have been difficult to discern on a dark night; as it was, the light would doubtless be perceived immediately on its appearance.

All day Sir John beat fruitlessly the bushes and long grass. He could not unearth a single animal that was fit to eat. The very birds, disturbed from their retreats, had gone to the underwood on the shore for shelter. Sir John was extremely vexed, inasmuch as he was not hunting merely for personal gratification, but to supply the necessities of the party. Perhaps he himself suffered from

hunger more than his three colleagues, whose attention was more riveted by their application to science. The sailors and Mokoum suffered equally with Sir John. One more day and their scanty reserve would be at an end, and if the pioneer's expedition were delayed, they would soon be exposed to a severe extremity of hunger,

The dark, calm night was passed in watching; but the horizon remained wrapped in shade, and no light appeared in the object-glass of the telescope. The minimum of time, however, allowed to the expedition had hardly expired, and they felt that they were bound to exhibit patience for a while.

The next day the garrison ate their last morsel of meat and biscuit; but their courage did not fail, and, though they should be obliged to feed on what herbs they could gather, they were resolved to hold out.

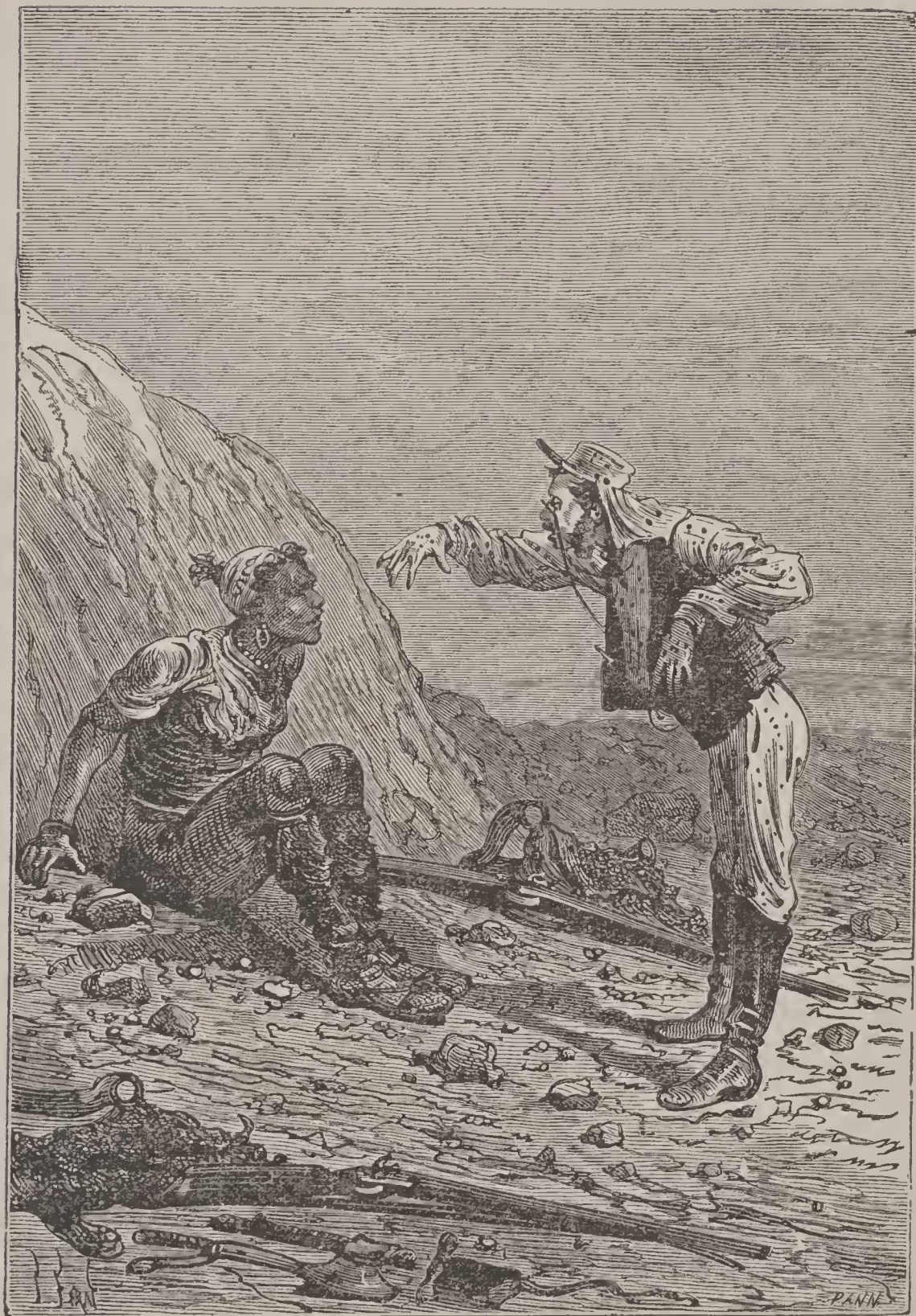
The succeeding night passed without any result. More than once the astronomers believed that they had seen the light, but it was always proved to be a star in the misty horizon.

On the 1st of March they were compelled absolutely to fast. Having been for some time accustomed to meagre and inadequate nourishment, they passed the first day without much acute suffering, but on the morrow they began to experience the pangs of craving. Sir John and Mokoum, haggard-eyed, and sensitive to the gnawings of

hunger, wandered over the top of the mountain ; but no game whatever was to be seen. They began to think that, as the Colonel had said, they should literally have to feed on grass. If they only had the stomachs of ruminants, thought poor Sir John, as he eyed the abundant pasturage, they would be able to hold out ; but still no game, still not even a bird ! He gazed intently over the lake, in which the sailors had fished in vain ; and it was impossible to get near the wary aquatic birds that skimmed the tranquil waters.

At last, worn out with fatigue, Sir John and his companion lay down on the grass at the foot of a mound of earth some five or six feet high. Here they fell, not precisely into a sleep, but into a heavy torpor, which for a while benumbed their sufferings. How long this drowsiness would have lasted neither of them could have said ; but in about an hour Sir John was aroused by a disagreeable pricking. He tried to slumber again, but the pricking continued, and at last impatiently he opened his eyes.

He was entirely covered, face, hands, and clothes, with swarms of white ants. He started to his feet, and his sudden movement aroused the bushman, who was covered in the same way. But to Sir John's great surprise, the bushman, instead of shaking off the insects, carried them by handfuls to his mouth, and devoured them greedily. Sir John's first sensation was disgust at his voracity.



The Rice of the Boerjesmen.—[Page 196.]

“Come, eat, do as I do!” said the bushman; “it is the rice of the Bochjesmen.”

And that was, in truth, the native term for these insects. The Bochjesmen feed on both the black and white species, but they consider the white to be of superior quality. The only drawback is, that they must be swallowed in large quantities to satisfy any longing for food. The Africans generally mix them with the gum of the mimosa, thus rendering them capable of affording a less unsubstantial meal; but as the mimosa did not grow on Mount Scorzef, the bushman had to content himself with his rice *au naturel*.

Sir John, in spite of his repugnance, resolved to imitate him. The insects poured forth by thousands from their enormous ant-hill, which was none other than the mound of earth by which the weary sufferers had reclined. Sir John took them by handfuls, and carried them to his lips; he did not dislike the flavour, which was a grateful acid; and gradually he felt his hunger moderated.

Mokoum did not forget his companions in misfortune. He ran to the fort, and brought out the garrison. The sailors were without difficulty induced to attack the singular food, and although the astronomers hesitated a moment, yet, encouraged by Sir John's example, and half dead with inanition, they soon at least assuaged the intenseness of their hunger by devouring considerable quantities of these ants.

But an unexpected incident procured for the starving men a more solid meal. In order to lay in a provision of the insects, Mokoum resolved to destroy one side of the enormous ant-hill. It consisted of a central conical mound, with smaller cones arranged at intervals round its base. The hunter had already made several blows with his hatchet, when a singular grunting sound from the centre attracted his attention: he paused in his work of destruction, and listened, while his companions watched him in silence. He struck a few more blows, and the groan was repeated more audibly than before. The bushman rubbed his hands, whilst his eyes evidently sparkled. Once more attacking the ant-hill, he opened a cavity about a foot wide. The ants were escaping on every side; but of them he took no heed, leaving the sailors to collect them in sacks. All at once a strange animal appeared at the mouth of the hole. It was a quadruped with a long snout, small mouth, and flexible tongue, which protruded to a great length; its ears were straight, its legs short, and its tail long and pointed. Long grey bristles with a reddish tinge covered its lank body, and its feet were armed with enormous claws. Mokoum killed it at once with a sharp blow on the snout. "There is our supper," he said. "It has been some time coming, but it will not taste the worse for that. Now for a fire, and a ramrod for a spit, and we will feast as we have never feasted in our lives."

The bushman speedily began to skin the animal, which was a species of octeropus or ant-eater, very common in South Africa, and known to the Dutch at the Cape under the name of "earth-pig." Swarms of ants are devoured by this creature, which catches them by means of its long glutinous tongue.

The meal was soon cooked ; perhaps it would have been better for a few more turns of the spit, but the hungry men were impatient. The firm, wholesome flesh was declared to be excellent, although slightly impregnated with the acid of the ants

After the repast the Europeans felt re-invigorated, and animated with more steadfast purpose to persevere ; and in truth there was need of encouragement. All through the following night no light appeared on Mount Volquiria.

CHAPTER XXI.

SUSPENSE.

IT was now the ninth day since Zorn and Emery had started on their expedition. Their colleagues, detained on the summit of Mount Scorzef, began to give way to the fear that they had fallen into some irretrievable misfortune. They were all well aware that the young astronomers would omit nothing that lay in their power to ensure the success of their enterprise, and they dreaded lest their courageous spirit should have exposed them to danger, or betrayed them into the hands of the wandering tribes. They waited always impatiently for the moment when the sun sank behind the horizon, that they might begin their nightly watch, and then all their hopes seemed concentrated on the field of their telescope.

All through the 3rd of March, wandering up and down the slopes, hardly exchanging a word, they suffered as they had never suffered before ; not even the heat and fatigues of the desert, nor the tortures of thirst, had equalled the pain that arose from their apprehensions. The last morsel

of the ant-eater had been devoured, and nothing now remained but the insufficient nourishment afforded by the ants.

Night came, dark and calm, and extremely favourable to their operations; but although the Colonel and Strux watched alternately with the utmost perseverance, no light appeared, and the sun's rays soon rendered any longer observations futile.

There was still nothing immediate to fear from the Makololos; they seemed resolved to reduce the besieged by famine, and it seemed hardly likely that they would desist from their project. The unhappy Europeans were tortured afresh with hunger, and could only diminish their sufferings by devouring the bulbs of the gladioli that sprang up between the rocks.

Yet they were hardly prisoners; their detention was voluntary. At any moment the steamboat would have carried them to a fertile land, where game and fruit abounded. Several times they discussed the propriety of sending Mokoum to the northern shore to hunt for the little garrison; but this manœuvre might be discovered by the natives; and there would be a risk to the steam-vessel, and consequently to the whole party, in the event of finding other hostile tribes to the north of the lake: accordingly the proposal was rejected, and it was decided that they must abide in company, and that all or none must depart. To

leave Mount Scorzeſ before the observations were complete was an idea that was not entertained for a moment ; the astronomers were determined to wait patiently until the faintest hope of success should be extinguished.

“ We are no worse off,” remarked the Colonel in the course of the day to his assembled companions, “ than Arago, Biot, and Rodriguez were when they were measuring the arc from Dunkirk to Ivica : they were uniting the Spanish coast and the island by a triangle of which the sides were more than eighty miles long. Rodriguez was installed on an isolated peak, and kept up lighted lamps at night, while the French astronomers lived in tents a hundred miles away in the desert of Las Palmas. For sixty nights Arago and Biot watched for the signal, and, discouraged at last, were about to renounce their labour, when, on the sixty-first night, appeared a light, which it was impossible to confound with a star. Surely, gentlemen, if those French astronomers could watch for sixty-one nights in the interests of science, we English and Russians must not give up at the end of nine.”

The Colonel’s companions most heartily approved the sentiment ; but they could have said that Arago and Biot did not endure the tortures of hunger during their long vigil.

In the course of the day Mokoum perceived an unusual agitation in the Makololo camp. He thought at first that

they were about to raise the siege, but, after some contemplation, he discovered that their intentions were evidently hostile, and that they would probably assault the mountain in the course of the night. All the women and children, under the protection of a few men, left the encampment, and turned eastward to the shores of the lake. It was probable that the natives were about to make a last attack on the fortress before retiring finally to Maketo. The bushman communicated his opinion to the Europeans. They resolved to keep a closer watch all night, and to have their guns in readiness. The enclosure of the fort was broken in several places, and as the number of the natives was now largely increased they would find no difficulty in forcing their way through the gaps. Colonel Everest therefore thought it prudent to have the steamboat in readiness for a retreat. The engineer received orders to light the fire, but not until sunset, lest the smoke should reveal the presence of the vessel to the natives ; and to keep up the steam, in order to start at the first signal. The evening repast was composed of white ants and gladiolus bulbs—a meagre supper for men about to fight with several hundred savages ; but they were resolute, and staunchly awaited the engagement which appeared imminent.

Towards six o'clock, when night was coming on with its tropical celerity, the engineer descended the mountain, and proceeded to light the fire of the steamboat. It was

still the Colonel's intention not to effect an escape until the last extremity : moreover, he was firm in his determination to abide until the night was advanced, that he might give himself the last chance of observing the signal from Mount Volquiria. The sailors were placed at the foot of the rampart, with orders to defend the breaches to the last. All arms were ready, and the mitrailleuse, armed with the heaviest ammunition that they had in store, spread its formidable mouth across the embrasure.

For several hours the Colonel and Strux, posted in the narrow donjon, kept a constant watch on the peak of Volquiria. The horizon was dark, while the finest of the southern constellations were resplendent in the zenith. There was no wind, and not a sound broke the imposing stillness of nature. The bushman, however, posted on a projection of rock, heard sounds which gradually became more distinct. He was not mistaken ; the Makololos were at length commencing their assault on the mountain.

Until ten o'clock the assailants did not move ; their fires were extinguished, and camp and plain were alike wrapped in obscurity. Suddenly Mokoum saw shadows moving up the mountain, till the besiegers seemed but a few hundred feet from the plateau on which stood the fort.

"Now then, quick and ready !" cried Mokoum.

The garrison immediately advanced to the south side of the fort, and opened a running fire on the assailants. The



Watching for the Signal from Mount Volquiria.—[Page 204.]

Makololos answered by a war-cry, and, in spite of the firing, continued to advance. In the light caused by the flash of the guns, the Europeans perceived such swarms of natives that resistance seemed impossible. But still they trusted that their well-directed balls were doing considerable execution, and they discerned that not a few of the natives were rolling down the sides of the mountain. Hitherto, however, nothing arrested them: with savage cries they continued to press on in compacted order, without even waiting to hurl a single dart. Colonel Everest put himself at the head of his little troop, who seconded him admirably, not excepting Palander, who probably was handling a gun for almost the first time. Sir John, now on one rock now on another, sometimes kneeling sometimes lying, did wonders, and his gun, heated with the rapidity of the repeated loading, began to burn his hands. Mokoum, as ever, was patient, bold, and undaunted in his confidence.

But the valour and precision of the besieged could avail nothing against the torrent of numbers. Where one native fell, he was replaced by twenty more, and, after a somewhat prolonged opposition, Colonel Everest felt that he must be overpowered. Not only did the natives swarm up the south slope of the mountain, but they made an ascent also by the side slopes. They did not hesitate to use the dead bodies of the fallen as stepping-stones, and they even lifted them up, and sheltered themselves behind them,

as they mounted. The scene revealed by the flash of the fire-arms was appalling, and the Europeans saw enough to make them fully aware that they could expect no quarter, and that they were being assaulted by barbarians as savage as tigers.

At half-past ten the foremost natives had reached the plateau. The besieged, who were still uninjured (the natives not yet having employed their arrows and assagais), were thoroughly conscious they were impotent to carry on a combat hand to hand. The Colonel, in a calm, clear voice that could be heard above the tumult, gave the order to retire. With a last discharge the little band withdrew behind the walls. Loud cries greeted their retreat, and the natives immediately made a nearer approach in their attempt to scale the central breach.

A strange and unlooked for reception awaited them. Suddenly at first, and subsequently repeated at intervals but of a few minutes, there was a growling reverberation as of rolling thunder. The sinister sound was the report of the exploding mitrailleuse, which Sir John had been prepared to employ, and now worked with all his energy. Its twenty-five muzzles spread over a wide range, and the balls, continually supplied by a self-adjusting arrangement, fell like hail among the assailants. The natives, swept down at each discharge, responded at first with a howl and then with a harmless shower of arrows.

"She plays well," said the bushman, approaching Sir John. "When you have played your tune, let me play mine."

But there was no need for Sir John to be relieved ; the mitrailleuse was soon silent. The Makololos were struck with consternation, and had sought shelter from the torrent of grape-shot, having retired under the flanks of the fort, leaving the plateau strewn with numbers of their dead.

In this instant of respite the Colonel and Strux regained the donjon, and there, collecting themselves to a composure as complete as if they were under the dome of an observatory, they kept a constant eye upon their telescope, and scanned the peak of Volquiria. When, after a short period of rest, the yells of the Makololos made them aware that the combat was renewed, they only persevered in their determination, and resolved that they would alternately remain to guard their invaluable instrument.

The combat, in truth, had been renewed, The range of the mitrailleuse was inadequate to reach all the natives, who, uttering their cries of mortal vengeance, rallied again, and swarmed up every opening. The besieged, protected by their fire-arms, defended the breaches foot by foot ; they had only received a few scratches from the points of the assagais, and were able to continue the fight for half an hour with unabated ardour.

Towards half-past eleven, while the Colonel was in the

thick of the fray, in the middle of an angry fusillade, Matthew Strux appeared at his side. His eye was wild and radiant : an arrow had just pierced his hat and quivered above his head.

“ The signal ! the signal ! ” he cried.

The Colonel was incredulous, but ascertaining the correctness of the welcome announcement, discharged his rifle for the last time, and with an exuberant shout of rejoicing, rushed towards the donjon, followed by his intrepid colleague. There, kneeling down, he placed his eye to the telescope, and perceived with the utmost delight the signal, so long delayed and yet so patiently expected.

It was truly a marvellous sight to see these two astronomers work during the tumult of the conflict. The natives had by their numbers forced the enclosure, and Sir John and the bushman were contending for every step. The Europeans fought with their balls and hatchets, while the Makololos responded with their arrows and assagais.

Meanwhile the Colonel and Strux intently continued their observations, and Palander, equally composed, noted down their oft-repeated readings. More than once an arrow grazed their head, and broke against the inner wall of the donjon. But their eye was ever fixed on the signal, and reading the indications of the vernier, they incessantly verified each other's calculations.

“ Only once more, ” said Strux, sliding the telescope along

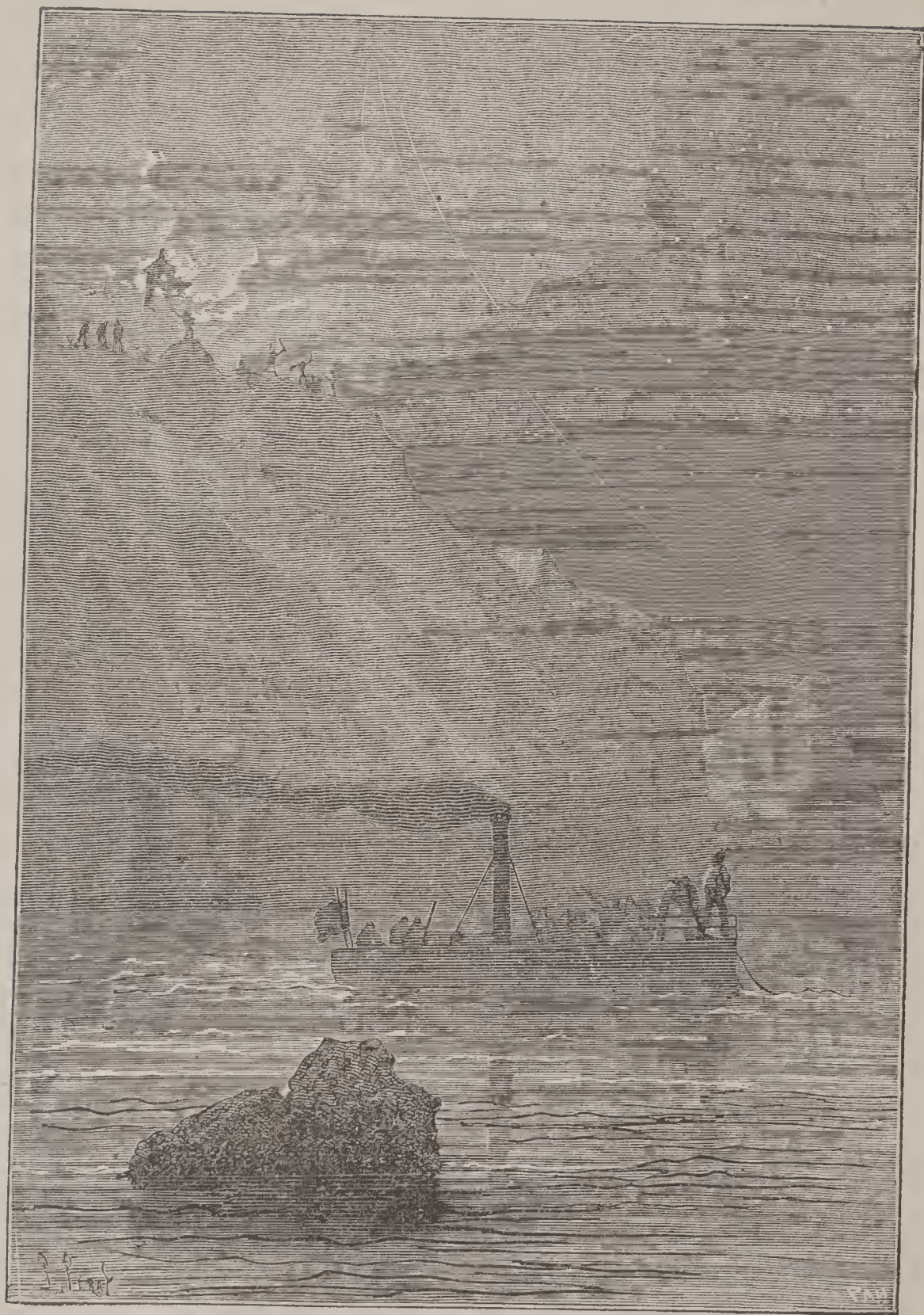
the graduated scale. An instant later, and it would have been too late for any observations, but the direction of the light was calculated to the minutest fraction of a second ; and at that very instant an enormous stone, hurled by a native, sent the register flying from Palander's hands, and smashed the repeating-circle.

They must now fly in order to save the result which they had obtained at the cost of such continuous labour. The natives had already penetrated the casemate, and might at any moment appear in the donjon. The Colonel and his colleagues caught up their guns, and Palander his precious register, and all escaped through one of the breaches. Their companions, some slightly wounded, were ready to cover their retreat, but just as they were about to descend the north side of the mountain, Strux remembered that they had failed to kindle the signal. In fact, for the completion of the survey, it was necessary that the two astronomers on Mount Volquiria should in their turn observe the summit of Mount Scorzef, and were doubtless anxiously expecting the answering light.

The Colonel recognized the imperative necessity for yet one more effort, and whilst his companions, with almost superhuman energy, repulsed the natives, he re-entered the donjon. This donjon was formed of an intricate framework of dry wood, which would readily ignite by the application of a flame. The Colonel set it alight with the powder from

the priming of his gun, and, rushing out, rejoined his companions. In a few moments, rolling their mitrailleuse before them, the Europeans, under a shower of arrows and various missiles, were descending the mountain, and, in their turn, driving back the natives with a deadly fire, reached the steamboat. The engineer, according to orders, had kept up the steam. The mooring was loosened, the screw set in motion, and the "Queen and Czar" advanced rapidly over the dark waters. They were shortly far enough out to see the summit of the mountain. The donjon was blazing like a beacon, and its light would be easily discerned from the peak of Volquiria. A resounding cheer of triumph from English and Russians greeted the bonfire they had left behind.

Emery and Zorn would have no cause for complaint; they had exhibited the twinkling of a star, and had been answered by the glowing of a sun.



The Steamboat leaving Mount Scorzef.—[Page 210.]

CHAPTER XXII.

HIDE AND SEEK.

WHEN daylight re-appeared, the vessel was nearing the northern shore of the lake. There was no trace of natives, consequently the Colonel and his companions, who had been ready armed, laid aside their guns as the "Queen and Czar" drew up in a little bay hollowed in the rocks. The bushman, Sir John, and one of the sailors set out at once to reconnoitre the neighbourhood. They could perceive no sign of Makololos, and fortunately they found game in abundance. Troops of antelopes grazed in the long grass and in the shelter of the thickets, and a number of aquatic birds frequented the shores of the lake. The hunters returned with ample provision, and the whole party could enjoy the savoury venison, a supply of which was now unlikely to fail them again.

The camp was arranged under the great willows near the lake, on the banks of a small river. The Colonel and Strux had arranged to meet on the northern shore with the pioneer's little party, and the rest afforded by the few days

of expectation was gratefully enjoyed by all. Palander employed himself in rectifying and adjusting the results of the latest observations, while Mokoum and Sir John hunted most vigorously over the fertile, well-watered country, abounding in game, of which the Englishman would have been delighted, had it been in his power, to complete a purchase on behalf of the British government. Three days after, on the 8th of March, some gun-shots announced the arrival of the remainder of the party for whom they tarried. Emery, Zorn, the two sailors, and the pioneer, were all in perfect health. Their theodolite, the only instrument remaining to the Commission, was safe. The young astronomers and their companions were received with joyous congratulations. In a few words they related that their journey had not been devoid of difficulty. For two days they had lost their way in the forests that skirted the mountainous district, and with only the vague indications of the compass they would never have reached Mount Volquiria, if it had not been for the shrewd intelligence of the pioneer. The ascent of the mountain was rough, and the delay had caused the young astronomers as much impatience as it had their colleagues on Mount Scorzef. They had carefully, by barometrical observations, calculated that the summit of Volquiria was 3200 feet above the level of the sea. The light, increased by a strong reflector, was first lighted on the night of the 4th; thus the observers on

Mount Scorzef had perceived it as soon as it appeared. Emery and Zorn had easily discerned the intense fire caused by the burning fortress, and with the theodolite had completed the measurement of the triangle.

“And did you determine the latitude of the peak?” said the Colonel to Emery.

“Yes, most accurately,” replied Emery; “we found it to be $19^{\circ} 37' 35.337''$.”

“Well, gentlemen,” said the Colonel, “we may say that our task is ended. We have measured, by means of sixty-three triangles, an arc of more than eight degrees in length; and when we have rigidly corrected our results, we shall know the exact value of the degree, and consequently of the *mètre*, in this part of the globe.”

A cheer of satisfaction could not be repressed amongst the others.

“And now,” added the Colonel, “we have only to descend the Zambesi in order to reach the Indian Ocean: is it not so, Mr Strux?”

“It is so,” answered Strux; “but I think we ought still to adopt some means of testing our previous operations. Let us continue our triangles until we find a place suitable for the direct measurement of a base. The agreement between the lengths of the base, obtained by the calculations and by the direct measurement, will alone tell what degree of accuracy we ought to attribute to our observations.”

Strux's proposition was unanimously adopted. It was agreed to construct a series of subsidiary triangles until a side could be measured with the platinum rods. The steamboat, descending the affluents of the Zambesi, was to await the travellers below the celebrated Victoria Falls. Every thing being arranged, the little troop, with the exception of four sailors on board the "Queen and Czar," started the next day at sunrise. Some stations had been chosen to the east and the angles measured, and along this favourable country, they hoped easily to accomplish their auxiliary series. The bushman had adroitly caught a quagga, of which, willing or unwilling, he made a beast of burden to carry the theodolite, the measuring-rods, and some other luggage of the caravan.

The journey proceeded rapidly. The undulated country afforded many points of sight for the small accessory triangles. The weather was fine, and it was not needful to have recourse to nocturnal observations. The travellers could nearly always find shelter in the woods, and, besides, the heat was not insufferable, since some vapours arose from the pools and streams which tempered the sun's rays. Every want was supplied by the hunters, and there was no longer any thing to be feared from the natives, who seemed to be more to the south of Lake Ngami.

Matthew Strux and the Colonel seemed to have forgotten all their personal rivalry, and although there was no close

intimacy between them, they were on the most perfect terms of courtesy.

Day after day, during a period of three weeks, the observations steadily proceeded. For the measurement of a base the astronomers required a tract of land that should be level for several miles, and the very undulations of the soil that were desirable for the establishment of the points of sight were unfavourable for that observation. They proceeded to the north-east, sometimes following the right bank of the Cnobi, one of the principal tributaries of the Upper Zambesi, in order to avoid Maketo, the chief settlement of the Makololos. They had now every reason to anticipate that their return would be happily accomplished, and that no further natural obstacle would occur, and they hoped that their difficulties were all at an end. The country which they were traversing was comparatively well known and they could not be far from the villages of the Zambesi which Livingstone had lately visited. They thus thought with reason that all the most arduous part of their task was over, when an incident, of which the consequences might have been serious, almost compromised the result of the whole expedition.

Nicholas Palander was the hero, or rather was nearly being the victim, of the adventure.

The intrepid but thoughtless calculator, unworried by his escape from the crocodiles, had still the habit of withdraw-

ing himself from his companions. In an open country there was no great danger in this, but in woods Palander's abstraction might lead to serious consequences. Strux and the bushman gave him many warnings, and Palander, though much astonished at what he considered an excess of prudence, promised to conform to their wishes.

On the 27th, some hours had passed since Strux and Mokoum had seen any thing of Palander. The little troop were travelling through thickets of low trees and shrubs, extending as far as the horizon. It was important to keep together, as it would be difficult to discover the track of any one lost in the wood. But seeing and fearing nothing, Palander, who had been posted, pencil in one hand, the register in the other, on the left flank of the troop, was not long in disappearing.

When, towards four o'clock, Strux and his companions found that Palander was no longer with them, they became extremely anxious. His former aberrations were still fresh in their remembrance, and it was probably the abstracted calculator alone by whom they had been forgotten. The march was stopped, and they all shouted in vain. The bushman and the sailors dispersed for a quarter of a mile in each direction, beating the bushes, trampling through the woods and long grass, firing off their guns, but yet without success. They became still more uneasy, especially Matthew Strux, to whose anxiety was joined an extreme



Palander robbed by the Chacma. — [Page 217.]

irritation against his unlucky colleague. This was not the first time that Palander had served them thus, and if the Colonel had laid any blame on him, Strux would not have known what to say. Under the circumstances, the only thing to be done was to encamp in the wood, and begin a more careful search.

The Colonel and his companions had just arranged to place their camp near a glade of considerable extent, when a cry, unlike any thing human, resounded at some distance to the left. Almost immediately, running at full speed, appeared Palander. His head was bare, his hair dishevelled, and his clothes torn in some parts almost to rags. His companions plied him with questions; but the unhappy man, with haggard and distended eye, whose compressed nostrils still further hindered his short jerking respiration, could not bring out a word.

What had happened? why had he wandered away? and why did he appear so terrified? At last, to their repeated questions, he gasped out, in almost unintelligible accents, something about the registers.

The astronomers shuddered; the registers, on which was inscribed every result of their operations, and which the calculator had never allowed out of his possession, even when asleep, these registers were missing. No matter whether Palander had lost them, or whether they had been stolen from him; they were gone, and all their labour was in vain!

While his companions, mutely terrified, only looked at each other, Matthew Strux could no longer restrain his anger. He burst forth into all manner of invective against the miserable man, threatening him with the displeasure of the Russian government, and adding, that if he did not suffer under the knout he should linger out his life in Siberia.

To all this Palander answered but by a movement of the head: he seemed to acquiesce in all these condemnations, and even thought the judgment would be too lenient.

"But perhaps he has been robbed," said the Colonel at last.

"What matters?" cried Strux, beside himself; "what business had he so far away from us, after our continual warning?"

"True," replied Sir John, "but we ought to know whether he has lost the registers or been robbed of them. Has any one robbed you, Palander?" continued he, turning to the poor man, who had sunk down with fatigue.

Palander made a sign of affirmation.

"Who?" continued Sir John. "Natives? Makololos?"

Palander shook his head.

"Well, then, Europeans?" asked Sir John.

"No," answered Palander in a stifled voice.

"Who then?" shouted Strux, shaking his clenched fists in Palander's face.

"They were neither natives—nor white men—but monkeys," stammered out Palander at last.

It was a fact that the unhappy man had been robbed by a monkey, and if the consequences of the incident had been less serious, the whole party would have broken out into laughter. Mokoum explained that what had just happened was of frequent occurrence. Many times, to his knowledge, had travellers been rifled by these pig-headed chacmas, a species of baboon very common in South African forests. The calculator had been plundered by these animals, though not without a struggle, as his ragged garments testified. Still, in the judgment of his companions, there was no excuse to be made: if he had remained in his proper place this irreparable loss would not have occurred.

"We did not take the trouble," began Colonel Everest, "to measure an arc of meridian in South Africa for a blunderer like you—"

He did not finish his sentence, conscious that it was useless to continue to abuse the unhappy man, whom Strux had not ceased to load with every variety of vituperation. The Europeans were, without exception, quite overpowered by emotion; but Mokoum, who was less sensitive to the importance of the loss, retained his self-possession.

"Perhaps even yet," he said, "something 'may be done to assist you in your perplexity. These chacmas are always careful of their stolen goods, and if we find the robber we

shall find the registers with him. But time is precious, and none must be lost."

The bushman had opened a ray of hope. Palander revived at the suggestion : he arranged his tattered clothes as best he could, and having accepted the jacket of one sailor and the hat of another, declared himself ready to lead his companions to the scene of his adventure.

They all started off towards the west, and passed the night and the ensuing day without any favourable result. In many places, by traces on the ground and the bark of the trees, the bushman and the pioneer recognized unmistakable vestiges of the baboons, of which Palander affirmed that he was sure he had seen no less than ten. The party was soon on their track, and advanced with the utmost precaution, the bushman affirming that he could only count on success in his search by taking the chacmas by surprise, since they were sagacious animals, such as could only be approached by some device of secrecy.

Early the following morning one of the Russian sailors, who was somewhat in front, perceived, if not the actual thief, yet one of its associates. He prudently returned to the little troop, who came at once to a halt. The Europeans, who had resolved to obey Mokoum in every thing, awaited his instructions. The bushman begged them to remain in quietness where they were, and, taking Sir John and the pioneer, turned towards the part of the wood

already visited by the sailor, carefully keeping under shelter of the trees and bushwood.

In a short time the bushman and his two companions caught sight of one chacma, and almost immediately of nine or ten more, gambolling among the branches. Crouching behind a tree, they attentively watched the animals, Their long tails were continually sweeping the ground, and their powerful muscles, sharp teeth, and pointed claws, rendered them formidable even to the beasts of prey. These chacmas are the terror of the Boers, whose fields of corn and maize, and occasionally whose habitations, are plundered by them.

Not one of the animals had as yet espied the hunters. but they all continued their sport, yelping and barking as though they were great ill-favoured dogs. The important point for determination was, whether the actual purloiner of the missing documents was there. All doubt was put aside when the pioneer pointed out a chacma wrapped in a rag of Palander's coat. Sir John felt that this creature must be secured at any price, but he was obliged to act with great circumspection, aware as he was that a single false movement would cause the whole herd to decamp at once.

"Stay here," said Mokoum to the pioneer; "Sir John and I will return to our companions, and set about surrounding the animals; but meanwhile do not lose sight of them.

The pioneer remained at his post, while Sir John and the bushman returned to Colonel Everest. The only means of securing the suspected culprit was to surround the whole troop. To accomplish this, the Europeans divided into separate detachments ; one composed of Strux, Emery, Zorn, and three sailors, was to join the pioneer, and to form a semicircle around him ; and the other, comprising the Colonel, Mokoum, Sir John, Palander, and the other three sailors, made a *détour* to the left, in order to fall back upon the herd from the other side

Implicitly following the bushman's advice, they all advanced with the utmost caution. Their guns were ready, and it was agreed that the chacma with the rags should be the aim for every shot.

Mokoum kept a watchful eye upon Palander, and insisted upon his marching close to himself, lest his unguardedness should betray him into some fresh folly. The worthy astronomer was almost beside himself in consternation at his loss, and evidently thought it a question of life or death.

After marching with the frequent halts which the policy of being unobserved suggested, and continuing to diverge for half an hour, the bushman considered that they might now fall back. He and his companions, each about twenty paces apart, advanced like a troop of Pawnies on a war-trail, without a word or gesture, avoiding even the least rustling in the branches. Suddenly the bushman stopped ; the rest instantly followed his example, and standing with their

finger on the lock of their guns, were ready to raise them to their shoulder. The band of chacmas was in sight, they were already sensible of some danger, and seemed on the look-out. The great animal which had stolen the registers had, to their fancy, an appearance of being especially agitated. It had been already recognized by Palander, who muttered something like an imprecation between his teeth.

The chacma looked as if it was making signs to its companions : some females, with their young ones on their shoulders, had collected in a group, and the males went to and fro around them. The hunters still drew on, one and all keeping a steady eye direct towards the ostensible thief. All at once, by an involuntary movement, Palander's gun went off in his hands. Sir John broke out into an exclamation of disgust, and instantly afterwards fired. Ten reports followed : three chacmas lay dead on the ground, and the rest, with a prodigious bound, passed over the hunters' heads.

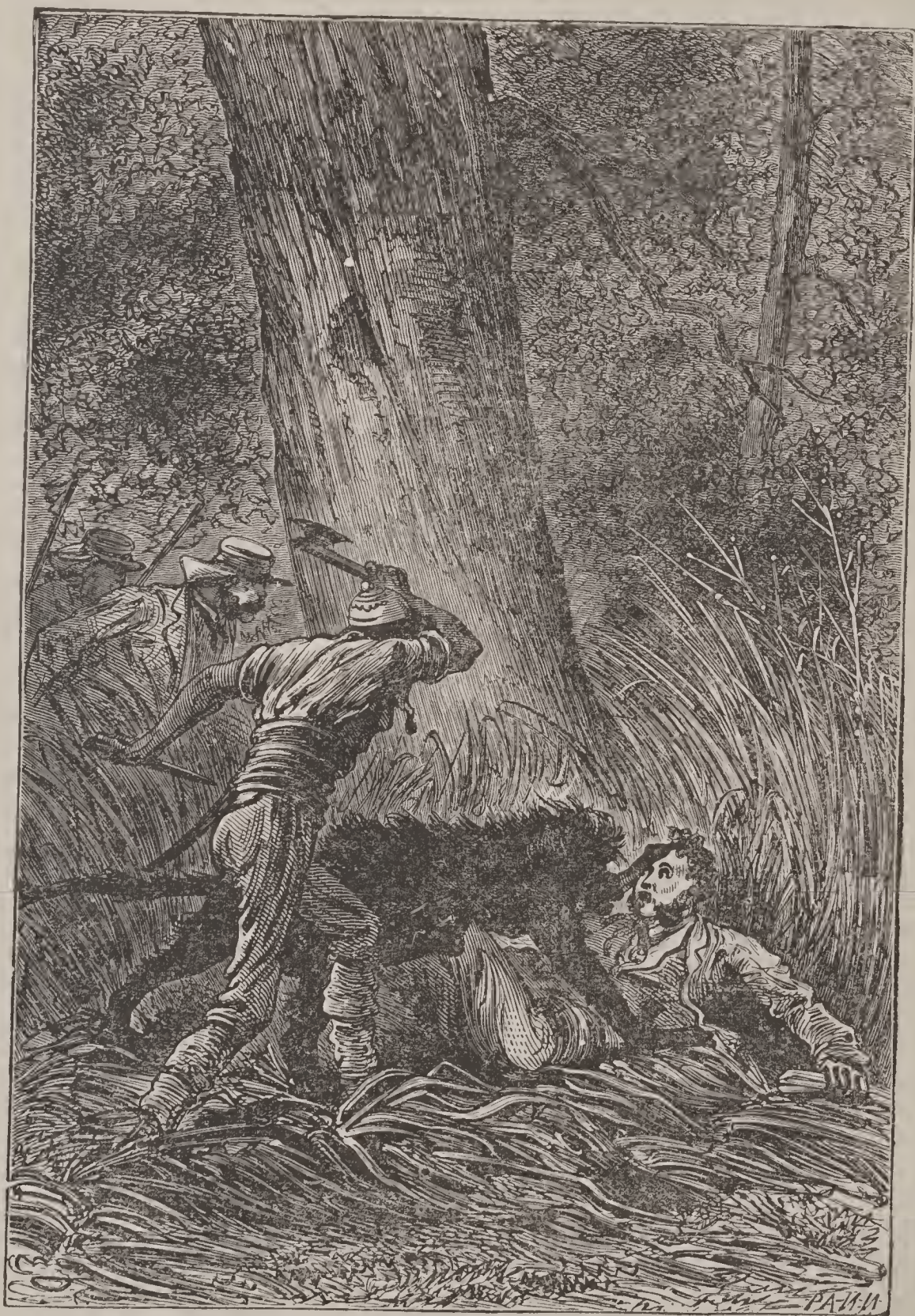
The robber baboon alone remained : it darted at the trunk of a sycamore, which it climbed with an amazing agility, and disappeared among the branches. The bushman, having keenly surveyed the spot, asserted that the registers were there concealed, and fearing lest the chacma should escape across the trees, he calmly aimed and fired. The animal, wounded in the leg, fell from branch to branch. In one of its fore-claws it was seen to clutch the registers, which it had taken from a fork of the tree.

At the sight, Palander, with a leap like a chamois, darted at the chacma, and a tremendous struggle ensued. The cries of both man and beast mingled in harsh and discordant strain, and the hunters dared not take aim at the chacma for fear of wounding their comrade. Strux, beside himself with rage, shouted again and again that they should fire, and in his furious agitation he would probably have done so, if it had not been that he was accidentally without a cartridge for his gun, which had been already discharged.

The combat continued ; sometimes Palander, sometimes the chacma, was uppermost. The astronomer, his shoulders lacerated by the creature's claws, tried to strangle his adversary. At last the bushman, seizing a favourable moment, made a sudden dash, and killed the ape with one blow of his hatchet.

Nicholas Palander, bleeding, exhausted, and insensible, was picked up by his colleagues : in his last effort he had recaptured his registers, which he was found unconsciously grasping to his bosom.

The carcase of the chacma was conveyed with glee to the camp. At the evening repast it furnished a delicious meal to the hunters. To all of them, but especially to Palander, not only had the excitement of the chase quickened their appetite for the palatable dish, but the relish was heightened by the gratifying knowledge that vengeance was satisfied.



Palander's Combat with the Chacma. — [Page 224.]

CHAPTER XXIII.

HOMEWARD BOUND.

PALANDER'S wounds were not serious : the bushman dressed the contused limbs with herbs, and the worthy astronomer, sustained by his triumph, was soon able to travel. Any exuberance on his part, however, was of short duration, and he quickly became again engrossed in his world of figures. He only now retained one of the registers, because it had been thought prudent that Emery should take possession of the other. Under the circumstances, Palander made the surrender with entire good-humour.

The operation of seeking a plain suitable for a base was now resumed. On the 1st of April the march was somewhat retarded by wide marshes ; to these succeeded numerous pools, whose waters spread a pestilential odour ; but, by forming larger triangles, Colonel Everest and his companions soon escaped the unhealthy region.

The whole party were in excellent spirits. Zorn and Emery

often congratulated themselves on the apparent concord that existed between their chiefs. Zorn one day expressed his hope to his friend that when they returned to Europe they would find that peace had been concluded between England and Russia, so that they might remain as good friends as they had been in Africa.

Emery replied that he acquiesced entirely in the hope: in days when war is seldom long protracted they might be sanguine all would be terminated by the date of their return.

Zorn had already understood from Emery that it was not his intention to return immediately to the Cape, and expressed his hope that he might introduce him to the observatory at Kiew. This proposal Emery expressed his desire to embrace, and added that he should indulge the expectation that Zorn would at some future time visit the Cape.

With these mutual assignments they made their plans for future astronomical researches, ever reiterating their hopes that the war would be at an end.

"Anyhow," observed Emery, "Russia and England will be at peace before the Colonel and Strux; I have no trust in any reconciliation of theirs."

For themselves, they could only repeat their pledges of mutual good-will.

Eleven days after the adventure with the chacmas, the

little troop, not far from the Zambesi Falls, arrived at a level plain several miles in extent, and perfectly adapted for the establishment of a base. On the edge of the plain rose a native village, composed of a few huts containing a small number of inhabitants, who kindly received the Europeans. Colonel Everest found the proximity of the natives very opportune, since the measurement of the base would occupy a month, and being without waggons, or any materials for an encampment, he would have had no resource but to pass the time in the open air, with no other shelter than that afforded by the foliage.

The astronomers took up their abode in the huts, which were quickly appropriated for the use of their new occupants. Their requirements were but small ; their one thought was directed towards verifying their calculations by measuring the last side of their last triangle.

The astronomers at once proceeded to their work. The trestles and platinum rods were arranged with all the care that had been applied to the earliest base. Nothing was neglected ; all the conditions of the atmosphere, and the variations of the thermometer, were taken into account, and the Commission, without flagging, brought every energy to bear upon their final operation.

The work, which lasted for five weeks, was completed on the 15th of May. When the lengths obtained had been estimated and reduced to the mean level of the sea at the

temperature of 61° Fahrenheit, Palander and Emery presented to their colleagues the following numbers:—

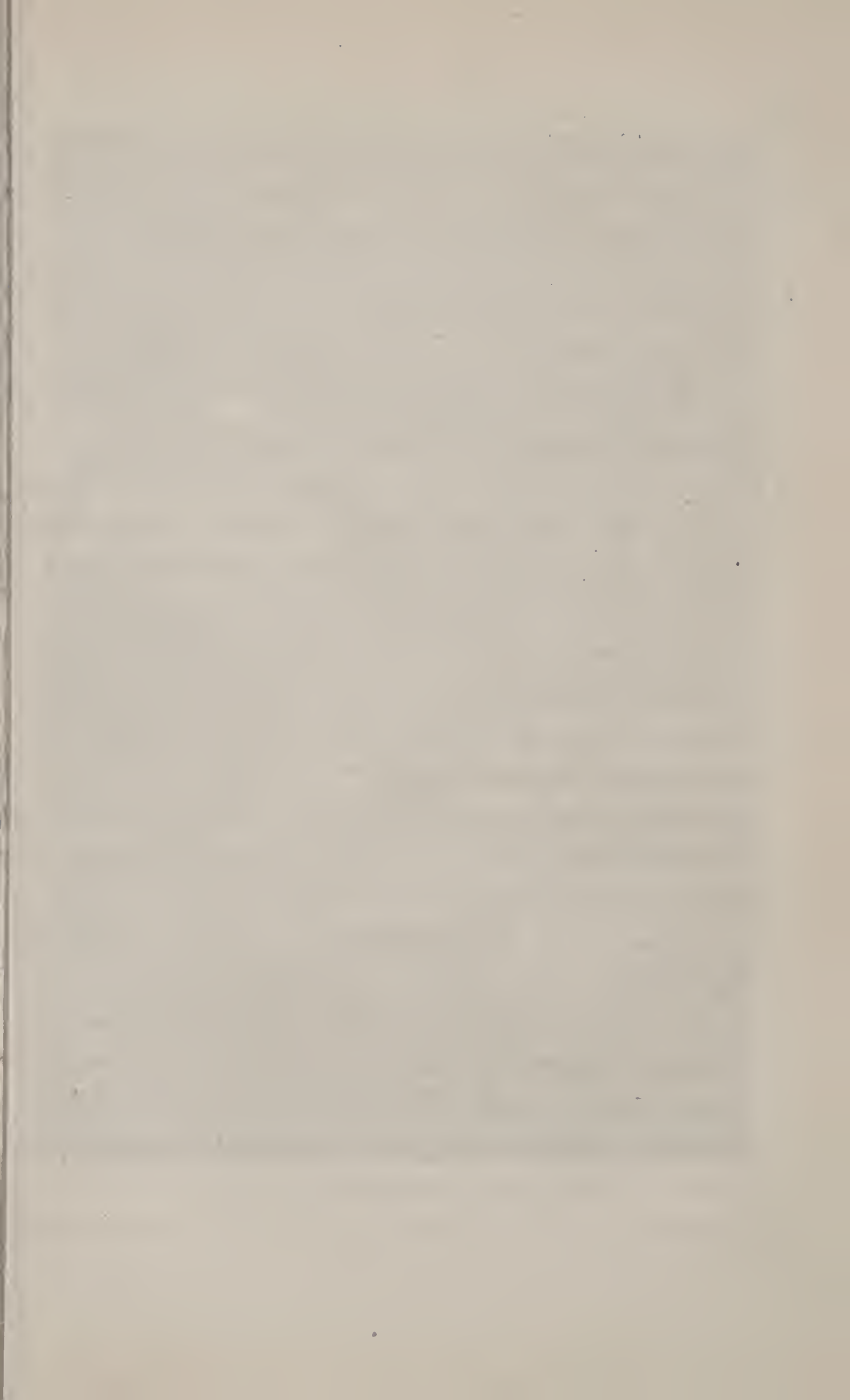
	Toises.
New base actually measured.	5075.25
The same base deduced trigonometrically from the entire series	5075.11
Difference between the calculation and the obser- vation14

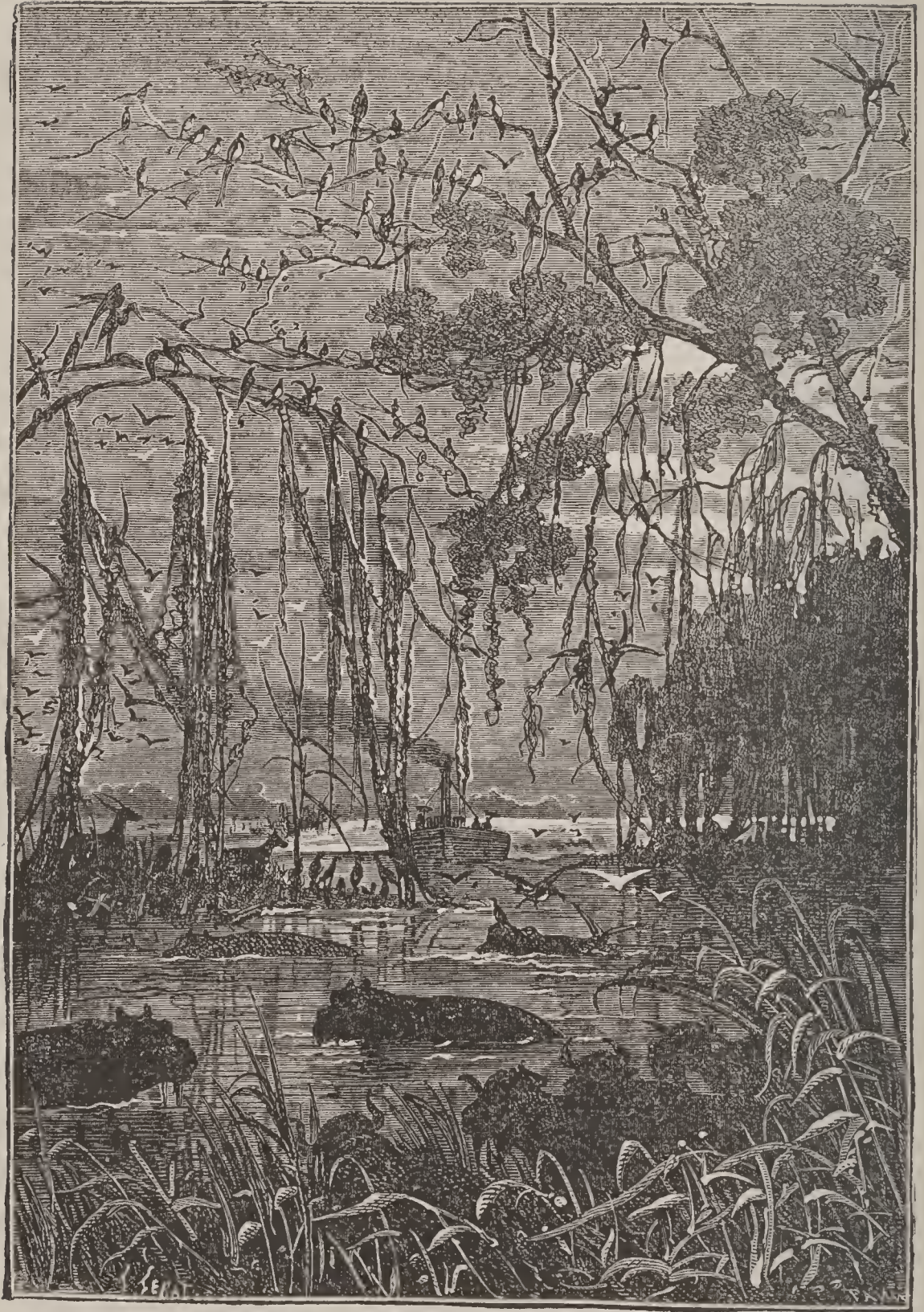
Thus there was only a difference of less than $\frac{1}{6}$ of a toise that is to say, less than ten inches; yet the first base and the last were six hundred miles apart.

When the meridian of France was measured from Dunkirk to Perpignan, the difference between the base at Melun and that at Perpignan was eleven inches. The agreement obtained by the Anglo-Russian Commission was still more remarkable, and thus made the work accomplished in the deserts of Africa, amid dangers of every kind, more perfect than any previous geodetic operation.

The accuracy of this unprecedented result was greeted by the astronomers with repeated cheers.

According to Palander's reductions, the value of a degree in this part of the world was 57037 toises. This was within a toise, the same as was found by Lacaille at the Cape in 1752: thus, at the interval of a century, the French astronomer and the members of the Anglo-Russian Commission had arrived at almost exactly the same result.





Descending the Zambesi. — [Page 229.]

To deduce the value of the mètre, they would have to wait the issue of the operations which were to be afterwards undertaken in the northern hemisphere. This value was to be the $\frac{1}{1000000}$ of the quadrant of the terrestrial meridian. According to previous calculations, the quadrant, taking the depression of the earth into account, comprised 10,000,856 mètres, which brought the exact length of the mètre to .013074 of a toise, or 3 feet 0 inches 11.296 lines. Whether this was correct the subsequent labours of the Commission would have to decide.

* * * * *

The astronomers had now entirely finished their task, and it only remained for them to reach the mouth of the Zambesi, by following inversely the route afterwards taken by Dr. Livingstone in his second voyage from 1858 to 1864.

On the 25th of May, after a somewhat laborious journey across a country intersected with rivers, they reached the Victoria Falls. These fine cataracts fully justified their native name, which signifies "sounding smoke." Sheets of water a mile wide, crowned with a double rainbow, rushed from a height twice that of Niagara. Across the deep basalt chasm the enormous torrent produced a roar like peal after peal of thunder.

Below the cataract, where the river regained its calmness, the steamboat, which had arrived a fortnight previously by

an inferior affluent of the Zambesi, awaited the astronomers, who soon took their places on board.

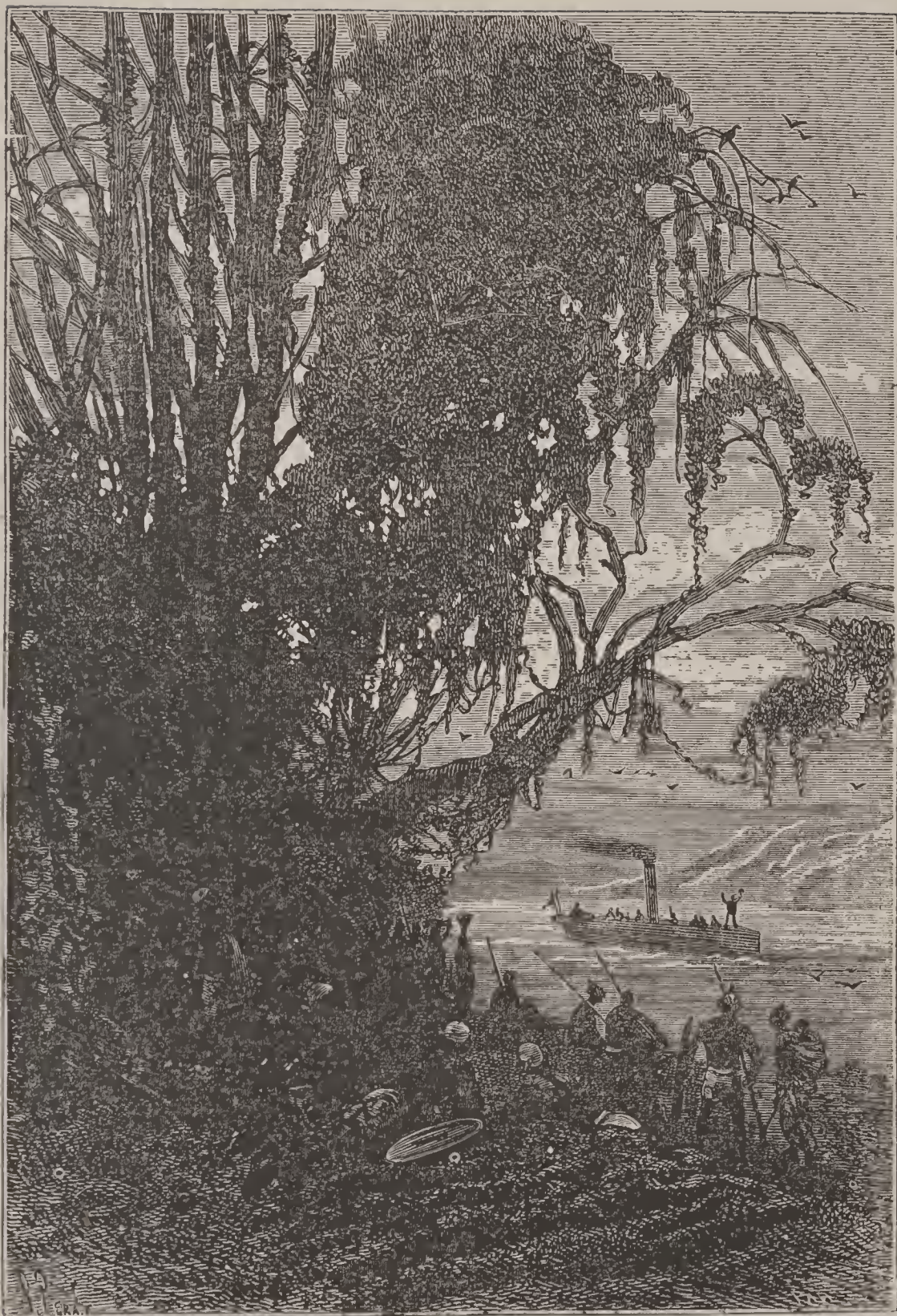
There were two to be left behind. Mokoum and the pioneer stood on the bank. In Mokoum the English were leaving, not only a devoted guide, but one whom they might call a friend. Sir John was especially sorry to part from him, and had offered to take him to Europe, and there entertain him as long as he pleased to remain. But Mokoum had previous engagements; in fact, he was to accompany Livingstone on the second voyage which the brave traveller was about to undertake up the Zambesi, and Mokoum was not a man to depart from his word. He was presented with a substantial recompense, and, what he prized still more, the kind assurances of regard of the Europeans, who acknowledged how much they owed to him. As the steamer left the shore to take the current in the middle of the river, Sir John's last gesture was to wave an adieu to his associate.

The descent of the great river, whose banks were dotted with numerous villages, was soon accomplished. The natives, regarding with superstitious admiration the smoking vessel as it moved by mysterious mechanism, made no attempt to obstruct its progress.

On the 15th of June the Colonel and his companions arrived at Quilimane, one of the principal towns at the mouth of the Zambesi. Their first thought was to ask for



Adieu to Mokoum. — [Page 230.]



The Natives regarded with superstitious admiration the smoking vessel.
[Page 230.]

news of the war. They found that it had not yet come to a termination, and that Sebastopol was still holding out against the allied armies. This was a disappointment to the Europeans, now so united in one scientific object ; but they received the intelligence in silence, and prepared to start. An Austrian merchant-vessel, "La Novara," was just setting out for Suez ; in that they resolved to take their passage.

Three days after, as they were on the point of embarking, the Colonel assembled his colleagues, and in a calm voice reminded them how in the last eighteen months they had together experienced many trials, and how they had been rewarded by accomplishing a work which would call forth the admiration of all scientific Europe. He could not refrain from giving expression to his trust that they would feel themselves bound in the common fellowship of a true alliance.

Strux bowed slightly, but did not interrupt the Colonel, who proceeded to deplore the tidings of the continuation of warfare. When he referred to the expected capitulation of Sebastopol, Strux indignantly rejected the possibility of such an event, which no union of France and England, he maintained, could ever effect.

There was, however, it was admitted on all hands, a propriety in the Russians and English submitting to the national status of hostility. The necessities of their position were thus

clearly defined, and under these conditions they embarked in company on board "La Novara."

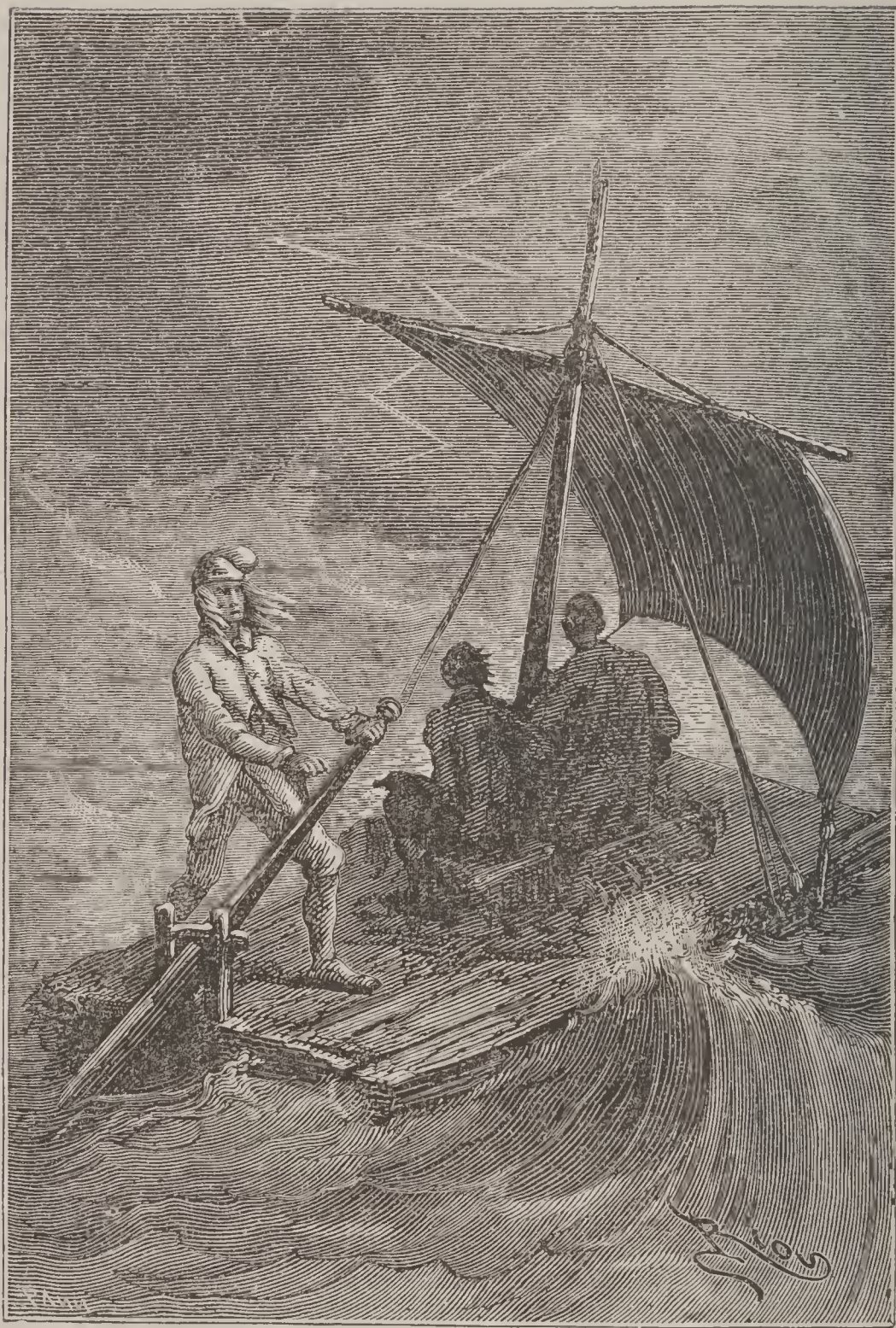
In a few days they arrived at Suez. At the moment of separation Emery grasped Zorn's hand, and said,—

"We are always friends, Michael!"

"Always and every where, William!" ejaculated Zorn; and with this sentiment of mutual devotion they parted.

The Commission was dissolved.

THE END



A HURRICANE IN THE CENTRE OF THE EARTH. AN ELECTRIC STORM.

A JOURNEY
TO THE
CENTRE OF THE EARTH,

TRANSLATED FROM THE FRENCH OF

JULES VERNE,

AUTHOR OF "FROM THE EARTH TO THE MOON," "THE MYSTERIOUS ISLAND,"
ETC., ETC.



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A JOURNEY

TO THE

CENTRE OF THE EARTH.

CHAPTER I.

MY UNCLE MAKES A GREAT DISCOVERY.

LOOKING back to all that has occurred to me since that eventful day, I am scarcely able to believe in the reality of my adventures. They were truly so wonderful that even now I am bewildered when I think of them.

My uncle was a German, having married my mother's sister, an Englishwoman. Being very much attached to his fatherless nephew, he invited me to study under him in his home in the fatherland. This home was in a large town, and my uncle a Professor of philosophy, chemistry, geology, mineralogy, and many other ologies.

One day, after passing some hours in the laboratory—my uncle being absent at the time—I suddenly felt the necessity of renovating the tissues—*i. e.*, I was hungry, and was about to rouse up our old French cook, when my uncle, Professor Von Hardwigg, suddenly opened the street door, and came rushing up stairs.

Now Professor Hardwigg, my worthy uncle, is by no means a bad sort of man; he is, however, choleric and

original. To bear with him means to obey; and scarcely had his heavy feet resounded within our joint domicile than he shouted for me to attend upon him.

“Harry—Harry—Harry——”

I hastened to obey, but before I could reach his room, jumping three steps at a time, he was stamping his right foot upon the landing.

“Harry!” he cried, in a frantic tone, “are you coming up?”

Now to tell the truth, at that moment I was far more interested in the question as to what was to constitute our dinner than in any problem of science; to me soup was more interesting than soda, an omelette more tempting than arithmetic, and an artichoke of ten times more value than any amount of asbestos.

But my uncle was not a man to be kept waiting; so adjourning therefore all minor questions, I presented myself before him.

He was a very learned man. Now most persons in this category supply themselves with information, as peddlers do with goods, for the benefit of others, and lay up stores in order to diffuse them abroad for the benefit of society in general. Not so my excellent uncle, Professor Hardwigg; he studied, he consumed the midnight oil, he pored over heavy tomes, and digested huge quartos and folios in order to keep the knowledge acquired to himself.

There was a reason, and it may be regarded as a good one, why my uncle objected to display his learning more than was absolutely necessary; he stammered; and when intent upon explaining the phenomena of the heavens, was apt to find himself at fault, and allude in such a vague way to sun, moon, and stars, that few were able to comprehend his meaning. To tell the honest truth, when the right word would not come, it was generally replaced by a very powerful adjective.

In connection with the sciences there are many almost unpronounceable names—names very much resembling those of Welsh villages; and my uncle being very fond of using them, his habit of stammering was not thereby improved. In fact, there were periods in his discourse when he would finally give up and swallow his discomfiture—in a glass of water.

As I said, my uncle, Professor Hardwigg, was a very learned man; and I now add a most kind relative. I was bound to him by the double ties of affection and interest. I took deep interest in all his doings, and hoped some day to be almost as learned myself. It was a rare thing for me to be absent from his lectures. Like him, I preferred mineralogy to all the other sciences. My anxiety was to gain *real knowledge of the earth*. Geology and mineralogy were to us the sole objects of life, and in connection with these studies many a fair specimen of stone, chalk, or metal did we break with our hammers.

Steel rods, loadstone, glass pipes, and bottles of various acids were oftener before us than our meals. My uncle Hardwigg was once known to classify six hundred different geological specimens by their weight, hardness, fusibility, sound, taste, and smell.

He corresponded with all the great, learned, and scientific men of the age. I was, therefore, in constant communication with, at all events the letters of, Sir Humphrey Davy, Captain Franklin, and other great men.

But before I state the subject on which my uncle wished to confer with me, I must say a word about his personal appearance. Alas! my readers will see a very different portrait of him at a future time, after he has gone through the fearful adventures yet to be related.

My uncle was fifty years old; tall, thin, and wiry. Large spectacles hid, to a certain extent, his vast, round and goggle eyes, while his nose was irreverently compared

to a thin file. So much indeed did it resemble that useful article, that a compass was said in his presence to have made considerable N* deviation.

The truth being told, however, the only article really attracted to my uncle's nose was tobacco.

Another peculiarity of his was, that he always stepped a yard at a time, clenched his fists as if he were going to hit you, and was, when in one of his peculiar humors, very far from a pleasant companion.

It is further necessary to observe, that he lived in a very nice house, in that very nice street, the Königstrasse at Hamburg. Though lying in the centre of a town, it was perfectly rural in its aspect—half wood, half bricks, with old-fashioned gables—one of the few old houses spared by the great fire of 1842.

When I say a nice house, I mean a handsome house—old, tottering, and not exactly comfortable to English notions: a house a little off the perpendicular and inclined to fall into the neighboring canal; exactly the house for a wandering artist to depict; all the more that you could scarcely see it for ivy and a magnificent old tree which grew over the door.

My uncle was rich; his house was his own property, while he had a considerable private income. To my notion the best part of his possessions was his god-daughter, Gretchen. And the old cook, the young lady, the Professor and I were the sole inhabitants.

I loved mineralogy, I loved geology. To me there was nothing like pebbles—and if my uncle had been in a little less of a fury, we should have been the happiest of families. To prove the excellent Hardwigg's impatience, I solemnly declare that when the flowers in the drawing-room pots began to grow, he rose every morning at four o'clock to make them grow quicker by pulling the leaves!

* (?) Nasal.



THE MUSEUM.

Having described my uncle, I will now give an account of our interview.

He received me in his study; a perfect museum, containing every natural curiosity that can well be imagined—minerals, however, predominating. Every one was familiar to me, having been catalogued by my own hand. My uncle, apparently oblivious of the fact that he had summoned me to his presence, was absorbed in a book. He was particularly fond of early editions, tall copies, and unique works.

“Wonderful!” he cried, tapping his forehead. “Wonderful—wonderful!”

It was one of those yellow-leaved volumes now rarely found on stalls, and to me it appeared to possess but little value. My uncle, however, was in raptures.

He admired its binding, the clearness of its characters, the ease with which it opened in his hand, and repeated aloud, half-a-dozen times, that it was very, very old.

To my fancy he was making a great fuss about nothing, but it was not my province to say so. On the contrary, I professed considerable interest in the subject, and asked him what it was about.

“It is the *Heims-Kringla* of Snorre Tarleson,” he said, “the celebrated Icelandic author of the twelfth century—it is a true and correct account of the Norwegian princes who reigned in Iceland.”

My next question related to the language in which it was written. I hoped at all events it was translated into German. My uncle was indignant at the very thought, and declared he wouldn't give a penny for a translation. His delight was to have found the original work in the Icelandic tongue, which he declared to be one of the most magnificent and yet simple idioms in the world—while at the same time its grammatical combinations were the most varied known to students.

"About as easy as German?" was my insidious remark. My uncle shrugged his shoulders.

"The letters at all events," I said, "are rather difficult of comprehension."

"It is a Runic manuscript, the language of the original population of Iceland, invented by Odin himself," cried my uncle, angry at my ignorance.

I was about to venture upon some misplaced joke on the subject, when a small scrap of parchment fell out of the leaves. Like a hungry man snatching at a morsel of bread the Professor seized it. It was about five inches by three and was scrawled over in the most extraordinary fashion.

The lines on page 12 are an exact fac-simile of what was written on the venerable piece of parchment—and have wonderful importance, as they induced my uncle to undertake the most wonderful series of adventures which ever fell to the lot of human beings.

My uncle looked keenly at the document for some moments and then declared that it was Runic. The letters were similar to those in the book, but then what did they mean? This was exactly what I wanted to know.

Now as I had a strong conviction that the Runic alphabet and dialect were simply an invention to mystify poor human nature, I was delighted to find that my uncle knew as much about the matter as I did—which was nothing. At all events, the tremulous motion of his fingers made me think so.

"And yet," he muttered to himself, "it is old Icelandic, I am sure of it."

And my uncle ought to have known, for he was a perfect polyglot dictionary in himself. He did not pretend, like a certain learned pundit, to speak the two thousand languages and four thousand idioms made use of in different parts of the globe, but he did know all the more important ones.

It is a matter of great doubt to me now, to what violent measures my uncle's impetuosity might have led him, had not the clock struck two, and our old French cook called out to let us know that dinner was on the table.

"Bother the dinner!" cried my uncle.

But as I was hungry, I sallied forth to the dining-room, where I took up my usual quarters. Out of politeness I waited three minutes, but no sign of my uncle, the Professor. I was surprised. He was not usually so blind to the pleasure of a good dinner. It was the acme of German luxury—parsley soup, a ham omelette with sorrel trimmings, an oyster of veal stewed with prunes, delicious fruit, and sparkling Moselle. For the sake of poring over this musty old piece of parchment, my uncle forbore to share our meal. To satisfy my conscience, I ate for both.

The old cook and housekeeper was nearly out of her mind. After taking so much trouble, to find her master not appear at dinner was to her a sad disappointment—which, as she occasionally watched the havoc I was making on the viands, became also alarm. If my uncle were to come to table after all?

Suddenly, just as I had consumed the last apple and drank the last glass of wine, a terrible voice was heard at no great distance. It was my uncle roaring for me to come to him. I made very nearly one leap of it—so loud, so fierce was his tone.

CHAPTER II.

THE MYSTERIOUS PARCHMENT.

Ж. А К И Н	Х Г А Т Н Т Р	Г Т Т Р И Б Р
Н У Т Г Г У Ф	Н К Т Т И Т Ф	К И Т Б А Г Т
Г Т Г Т У К	Т Т А Т Т Т Г	Г Т Б Б А А К
Т У Т К Т Т И	К Н Т Т Т Т	А А И Т Г Т
Т Т Н Т Т А	. К Г Р А Р	Т Т Т Т Б Г
Р Р Б А У И	Т Т Н Т Н Р	Ф А Т К Т Н
Б Т , Т Т Р	Б Г Т И Б К	Р Т Б И И

"I DECLARE," cried my uncle, striking the table fiercely with his fist, "I declare to you it is Runic—and contains some wonderful secret, which I must get at, at any price."

I was about to reply when he stopped me.

"Sit down," he said, quite fiercely, "and write to my dictation."

I obeyed.

"I will substitute," he said, "a letter of our alphabet for that of the Runic: we will then see what that will produce. Now, begin and make no mistakes."

The dictation commenced with the following incomprehensible result:—

<i>m.rnlls</i>	<i>esruel</i>	<i>seecJde</i>
<i>sgtssmf</i>	<i>unteief</i>	<i>niedrke</i>
<i>kt,samn</i>	<i>atrateS</i>	<i>Saodrrn</i>
<i>emtnael</i>	<i>nuaect</i>	<i>rrilSa</i>
<i>Atvaar</i>	<i>.nscrc</i>	<i>ieaabs</i>
<i>cedrmi</i>	<i>ceutul</i>	<i>frantu</i>
<i>dt,iac</i>	<i>oseibo</i>	<i>KediiI</i>

Scarcely giving me time to finish, my uncle snatched the document from my hands and examined it with the most rapt and deep attention.

"I should like to know what it means," he said, after a long period.

I certainly could not tell him, nor did he expect me to—his conversation being uniformly answered by himself.

"I declare it puts me in mind of a cryptograph," he cried, "unless, indeed, the letters have been written without any real meaning; and yet why take so much trouble? Who knows but I may be on the verge of some great discovery?"

My candid opinion was that it was all rubbish! But this opinion I kept carefully to myself, as my uncle's choler was not pleasant to bear. All this time he was comparing the book with the parchment.

"The manuscript volume and the smaller document are written in different hands," he said, "the cryptograph is of much later date than the book; there is an undoubted proof of the correctness of my surmise. [An irrefragable proof I took it to be.] The first letter is a double M, which was only added to the Icelandic language in the twelfth century—this makes the parchment two hundred years posterior to the volume."

The circumstances appeared very probable and very logical, but it was all surmise to me.

"To me it appears probable that this sentence was written by some owner of the book. Now who was the owner, is the next important question. Perhaps by great good luck it may be written somewhere in the volume."

With these words Professor Hardwigg took off his spectacles, and, taking a powerful magnifying glass, examined the book carefully.

On the fly leaf was what appeared to be a blot of ink,

but on examination proved to be a line of writing almost effaced by time. This was what he sought; and, after some considerable time, he made out these letters :

1 A K T 4 T Y K N 4 4 T X

“Arne Saknussem!” he cried in a joyous and triumphant tone, “that is not only an Icelandic name, but of a learned professor of the sixteenth century, a celebrated alchemist.”

I bowed as a sign of respect.

“These alchemists,” he continued, “Avicena, Bacon, Lully, Paracelsus, were the true, the only learned men of the day. They made surprising discoveries. May not this Saknussem, nephew mine, have hidden on this bit of parchment some astounding invention? I believe the cryptograph to have a profound meaning—which I must make out.”

My uncle walked about the room in a state of excitement almost impossible to describe.

“It may be so, sir,” I timidly observed, “but why conceal it from posterity, if it be a useful, a worthy discovery?”

“Why—how should I know? Did not Galileo make a secret of his discoveries in connection with Saturn? But we shall see. Until I discover the meaning of this sentence I will neither eat nor sleep.”

“My dear uncle——” I began.

“Nor you neither,” he added.

It was lucky I had taken double allowance that day.

“In the first place,” he continued, “there must be a clue to the meaning. If we could find that, the rest would be easy enough.”

I began seriously to reflect. The prospect of going

without food and sleep was not a promising one, so I determined to do my best to solve the mystery. My uncle, meanwhile, went on with his soliloquy.

"The way to discover it is easy enough. In this document there are one hundred and thirty-two letters, giving seventy-nine consonants to fifty-three vowels. This is about the proportion found in most southern languages, the idioms of the north being much more rich in consonants. We may confidently predict, therefore, that we have to deal with a southern dialect."

Nothing could be more logical.

"Now," said Professor Hardwigg, "to trace the particular language."

"As Shakspeare says, 'that is the question,' " was my rather satirical reply.

"This man Saknussem," he continued, "was a very learned man: now as he did not write in the language of his birth-place, he probably, like most learned men of the sixteenth century, wrote in Latin. If, however, I prove wrong in this guess, we must try Spanish, French, Italian, Greek, and even Hebrew. My own opinion, though, is decidedly in favor of Latin."

This proposition startled me. Latin was my favorite study, and it seemed sacrilege to believe this gibberish to belong to the country of Virgil.

"Barbarous Latin, in all probability," continued my uncle, "but still Latin."

"Very probably," I replied, not to contradict him.

"Let us see into the matter," continued my uncle; "here you see we have a series of one hundred and thirty-two letters, apparently thrown pell-mell upon paper, without method or organization. There are words which are composed wholly of consonants, such as *m.rnlls*, others which are nearly all vowels, the fifth, for instance, which is *unteief*, and one of the last *oseibo*. This appears an

extraordinary combination. Probably we shall find that the phrase is arranged according to some mathematical plan. No doubt a certain sentence has been written out and then jumbled up—some plan to which some figure is the clue. Now, Harry, to show your English wit—what is that figure?”

I could give him no hint. My thoughts were indeed far away. While he was speaking I had caught sight of the portrait of my cousin Gretchen, and was wondering when she would return.

We were affianced, and loved one another very sincerely. But my uncle, who never thought even of such sublunary matters, knew nothing of this. Without noticing my abstraction, the Professor began reading the puzzling cryptograph all sorts of ways, according to some theory of his own. Presently, rousing my wandering attention, he dictated one precious attempt to me.

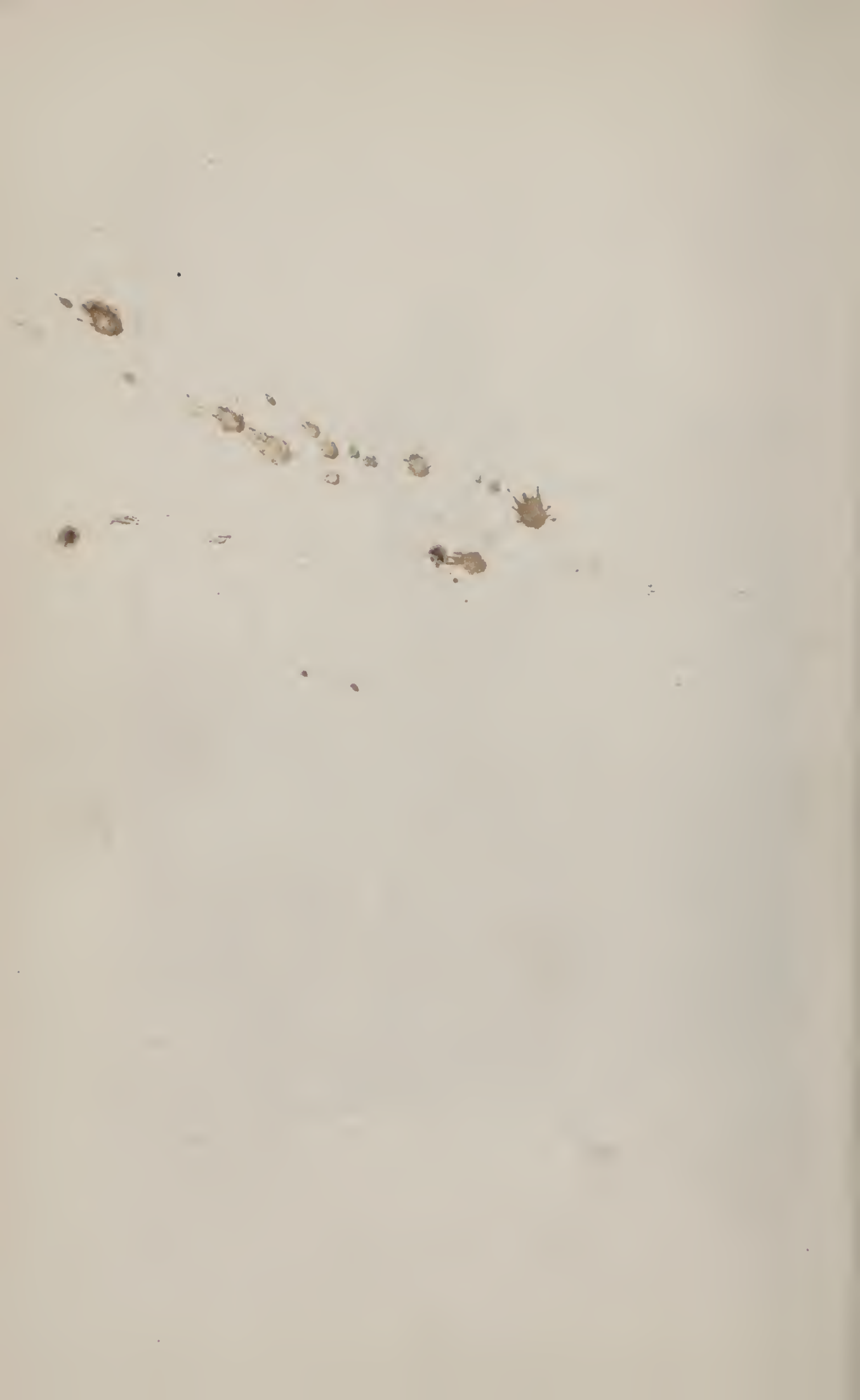
I mildly handed it over to him. It read as follows:—

*mmessunkaSenrA.icefdoK.segnittamurtn
ecertserrette,rotaivsadua,ednecsedsadne
lacartniiiluJsiratracSarbmutabledmek
meretarcsilucoIsleffenSnI.*

I could scarcely keep from laughing, while my uncle, on the contrary, got in a towering passion, struck the table with his fist, darted out of the room, out of the house, and then taking to his heels was presently lost to sight.



PROFESSOR VON HARDWIGG.



CHAPTER III.

AN ASTOUNDING DISCOVERY.

"WHAT is the matter?" cried the cook, entering the room; "when will master have his dinner?"

"Never."

"And, his supper?"

"I don't know. He says he will eat no more, neither shall I. My uncle has determined to fast and make me fast until he makes out this abominable inscription," I replied.

"You will be starved to death," she said.

I was very much of the same opinion, but not liking to say so, sent her away, and began some of my usual work of classification. But boy as I made myself, nothing could keep me from thinking alternately of the stupid manuscript and of the pretty Gretchen.

Several times I thought of going out, but my uncle would have been angry at my absence. At the end of an hour, my allotted task was done. How to pass the time? I began by lighting my pipe. Like all other students, I delighted in tobacco; and, seating myself in the great arm-chair, I began to think.

Where was my uncle? I could easily imagine him tearing along some solitary road, gesticulating, talking to himself, cutting the air with his cane, and still thinking of the absurd bit of hieroglyphics. Would he hit upon some clue? Would he come home in better humor? While these thoughts were passing through my brain, I mechanically took up the execrable puzzle and tried every imaginable way of grouping the letters. I put them together by twos, by threes, fours, and fives—in vain.

Nothing intelligible came out, except that the fourteenth, fifteenth and sixteenth made *ice* in English ; the eighty-fourth, eighty-fifth and eighty-sixth, the word *sir* ; then at last I seemed to find the Latin words *rota*, *mutabile*, *ira*, *nec*, *atra*.

“ Ha ! there seems to be some truth in my uncle’s notion,” thought I.

Then again I seemed to find the word *luco*, which means sacred wood. Then in the third line I appeared to make out *labiled*, a perfect Hebrew word, and at the last the syllables *mère*, *are*, *mer*, which were French.

It was enough to drive one mad. Four different idioms in this absurd phrase. What connection could there be between ice, sir, anger, cruel, sacred wood, changing, mother, are and sea ? The first and the last might, in a sentence connected with Iceland, mean sea of ice. But what of the rest of this monstrous cryptograph ?

I was, in fact, fighting against an insurmountable difficulty ; my brain was almost on fire ; my eyes were strained with staring at the parchment ; the whole absurd collection of letters appeared to dance before my vision in a number of black little groups. My mind was possessed with temporary hallucination—I was stifling. I wanted air. Mechanically I fanned myself with the document, of which now I saw the back and then the front.

Imagine my surprise when glancing at the back of the wearisome puzzle, the ink having gone through, I clearly made out Latin words, and among others *craterem* and *terrestre*.

I had discovered the secret !

It came upon me like a flash of lightning. I had got the clue. All you had to do to understand the document was to read it backwards. All the ingenious ideas of the Professor were realized ; he had dictated it rightly to me ; by a mere accident I had discovered what he so much desired.

My delight, my emotion may be imagined, my eyes were dazzled and I trembled so that at first I could make nothing of it. One look, however, would tell me all I wished to know.

"Let me read," I said to myself, after drawing a long breath.

I spread it before me on the table, I passed my finger over each letter, I spelt it through ; in my excitement I read it out.

What horror and stupefaction took possession of my soul. I was like a man who had received a knock-down blow. Was it possible that I really read the terrible secret, and it had really been accomplished ! A man had dared to do—what ?

No living being should ever know.

"Never !" cried I, jumping up ; "Never shall my uncle be made aware of the dread secret. He would be quite capable of undertaking the terrible journey. Nothing would check him, nothing stop him. Worse, he would compel me to accompany him, and we should be lost forever. But no ; such folly and madness cannot be allowed."

I was almost beside myself with rage and fury.

"My worthy uncle is already nearly mad," I cried aloud. "This would finish him. By some accident he may make the discovery ; in which case, we are both lost. Perish the fearful secret—let the flames forever bury it in oblivion."

I snatched up book and parchment, and was about to cast them into the fire, when the door opened and my uncle entered.

I had scarcely time to put down the wretched documents before my uncle was by my side. He was profoundly absorbed. His thoughts were evidently bent on the terrible parchment. Some new combination had probably struck him while taking his walk.

He seated himself in his arm-chair, and with a pen began to make an algebraical calculation. I watched him with anxious eyes. My flesh crawled as it became probable that he would discover *the* secret.

His combinations I knew now were useless, I having discovered the one only clue. For three mortal hours he continued without speaking a word, without raising his head, scratching, re-writing, calculating over and over again. I knew that in time he must hit upon the right phrase. The letters of every alphabet have only a certain number of combinations. But then years might elapse before he would arrive at the correct solution.

Still time went on ; night came, the sounds in the streets ceased—and still my uncle went on, not even answering our worthy cook when she called us to supper.

I did not dare to leave him, so waved her away, and at last fell asleep on the sofa.

When I awoke my uncle was still at work. His red eyes, his pallid countenance, his matted hair, his feverish hands, his hecticly flushed cheeks, showed how terrible had been his struggle with the impossible, and what fearful fatigue he had undergone during that long sleepless night. It made me quite ill to look at him. Though he was rather severe with me, I loved him, and my heart ached at his sufferings. He was so overcome by one idea that he could not even get in a passion ! All his energies were focussed on one point. And I knew that by speaking one little word all this suffering would cease. I could not speak it.

My heart was, nevertheless, inclining towards him. Why, then, did I remain silent ? In the interest of my uncle himself.

“Nothing shall make me speak,” I muttered. “He will want to follow in the footsteps of the other ! I know him well. His imagination is a perfect volcano, and to



HARRY IN A BROWN STUDY.

make discoveries in the interests of geology he would, sacrifice his life. I will therefore be silent and strictly keep the secret I have discovered. To reveal it would be suicidal. He would not only rush, himself, to destruction, but drag me with him."

I crossed my arms, looked another way and smoked—resolved never to speak.

When our cook wanted to go out to market, or on any other errand, she found the front door locked and the key taken away. Was this done purposely or not? Surely Professor Hardwigg did not intend the old woman and myself to become martyrs to his obstinate will. Were we to be starved to death? A frightful recollection came to my mind. Once we had fed on bits and scraps for a week while he sorted some curiosities. It gave me the cramp even to think of it!

I wanted my breakfast, and I saw no way of getting it. Still my resolution held good. I would starve rather than yield. But the cook began to take me seriously to task. What was to be done? She could not go out; and I dared not.

My uncle continued counting and writing; his imagination seemed to have translated him to the skies. He neither thought of eating nor drinking. In this way twelve o'clock came round. I was hungry, and there was nothing in the house. The cook had eaten the last bit of bread. This could not go on. It did, however, until two, when my sensations were terrible. After all, I began to think the document very absurd. Perhaps it might only be a gigantic hoax. Besides, some means would surely be found to keep my uncle back from attempting any such absurd expedition. On the other hand, if he did attempt anything so Quixotic, I should not be compelled to accompany him. Another line of reasoning partially decided me. Very likely he would make the discovery him-

self when I should have suffered starvation for nothing. Under the influence of hunger this reasoning appeared admirable. I determined to tell all.

The question now arose as to how it was to be done. I was still dwelling on the thought, when he rose and put on his hat.

What! go out and lock us in? Never!

"Uncle," I began.

He did not appear even to hear me.

"Professor Hardwigg," I cried.

"What," he retorted, "did you speak?"

"How about the key?"

"What key—the key of the door?"

"No—of these horrible hieroglyphics?"

He looked at me from under his spectacles, and started at the odd expression of my face. Rushing forward, he clutched me by the arm and keenly examined my countenance. His very look was an interrogation.

I simply nodded.

With an incredulous shrug of the shoulders, he turned upon his heel. Undoubtedly he thought I had gone mad.

"I have made a very important discovery."

His eyes flashed with excitement. His hand was lifted in a menacing attitude. For a moment neither of us spoke. It is hard to say which was most excited.

"You don't mean to say that you have any idea of the meaning of the scrawl?"

"I do," was my desperate reply. "Look at the sentence as dictated by you."

"Well, but it means nothing," was the angry answer.

"Nothing if you read from left to right, but mark, if from right to left——"

"Backwards!" cried my uncle, in wild amazement. "Oh most cunning Saknussem; and I to be such a blockhead!"

He snatched up the document, gazed at it with haggard eye, and read it out as I had done.

It read as follows :—

*In Sneffels yoculis craterem kem debebat
Umbra Scartaris Julii intra calendas descende.
Audas viator, et terrestre centrum attinges,
Kod feci. Arne Saknussem.*

Which dog-Latin being translated, reads as follows:—

“Descend into the crater of Yocul of Sneffels, which the shade of Scartaris caresses, before the kalends of July, audacious traveller, and you will reach the centre of the earth. I did it. ARNE SAKNUSSEMM.”

My uncle leaped three feet from the ground with joy. He looked radiant and handsome. He rushed about the room wild with delight and satisfaction. He knocked over tables and chairs. He threw his books about until at last, utterly exhausted, he fell into his arm-chair.

“What’s o’clock?” he asked.

“About three.”

“My dinner does not seem to have done me much good,” he observed, “Let me have something to eat. We can then start at once. Get my portmanteau ready.”

“What for?”

“And your own,” he continued. “We start at once.”

My horror may be conceived. I resolved however to show no fear. Scientific reasons were the only ones likely to influence my uncle. Now, there were many against this terrible journey. The very idea of going down to the centre of the earth was simply absurd. I determined therefore to argue the point after dinner.

My uncle’s rage was now directed against the cook for having no dinner ready. My explanation however satisfied him, and giving her the key she soon contrived to get sufficient to satisfy our voracious appetites.

During the repast my uncle was rather gay than other-

wise. He made some of those peculiar jokes which belong exclusively to the learned. As soon however as dessert was over, he called me to his study. We each took a chair on opposite sides of the table.

"Henry," he said, in a soft and winning voice; "I have always believed you ingenious, and you have rendered me a service never to be forgotten. Without you, this great, this wondrous discovery would never have been made. It is my duty, therefore, to insist on your sharing the glory."

"He is in a good humor," thought I; "I'll soon let him know my opinion of glory."

"In the first place," he continued, "you must keep the whole affair a profound secret. There is no more envious race of men than scientific discoverers. Many would start on the same journey. At all events, we will be the first in the field."

"I doubt your having many competitors," was my reply.

"A man of real scientific acquirements would be delighted at the chance. We should find a perfect stream of pilgrims on the traces of Arne Saknussemm, if this document were once made public.

"But my dear sir, is not this paper very likely to be a hoax?" I urged.

"The book in which we find it is sufficient proof of its authenticity," he replied.

"I thoroughly allow that the celebrated Professor wrote the lines, but only, I believe, as a kind of mystification," was my answer.

Scarcely were the words out of my mouth, when I was sorry I had uttered them. My uncle looked at me with a dark and gloomy scowl, and I began to be alarmed for the results of our conversation. His mood soon changed, however, and a smile took the place of a frown.

"We shall see," he remarked, with decisive emphasis.

"But see, what is all this about Yocul, and Sneffels,



TRACING OUR ROUTE.

and this Scartaris? I have never heard anything about them."

"The very point to which I am coming. I lately received from my friend, Augustus Peterman, of Leipzig, a map. Take down the third atlas from the second shelf, series Z, plate 4.

I rose, went to the shelf, and presently returned with the volume indicated.

"This," said my uncle, "is one of the best maps of Iceland. I believe it will settle all your doubts, difficulties and objections."

With a grim hope to the contrary, I stooped over the map.

CHAPTER IV.

WE START ON THE JOURNEY.

"You see, the whole island is composed of volcanoes," said the Professor, "and remark carefully that they all bear the name of Yokul. The word is Icelandic, and means a glacier. In most of the lofty mountains of that region the volcanic eruptions come forth from ice-bound caverns. Hence the name applied to every volcano on this extraordinary island."

"But what does this word Sneffels mean?"

"To this question I expected no rational answer. I was mistaken.

"Follow my finger to the western coast of Iceland, there you see Reykjavik, its capital. Follow the direction of one of its innumerable fjords or arms of the sea, and what do you see below the sixty-fifth degree of latitude?"

"A peninsula—very like a thigh-bone in shape."

"And in the centre of it——?"

"A mountain."

"Well, that's Sneffels."

I had nothing to say.

"That is Sneffels—a mountain about five thousand feet in height, one of the most remarkable in the whole island, and certainly doomed to be the most celebrated in the world, for through its crater we shall reach the Centre of the Earth."

"Impossible!" cried I, startled and shocked at the thought.

"Why impossible?" said Professor Hardwigg in his severest tones.

“Because its crater is choked with lava, by burning rocks—by infinite dangers.”

“But if it be extinct?”

“That would make a difference.”

“Of course it would. There are about three hundred volcanoes on the whole surface of the globe—but the greater number are extinct. Of these Sneffels is one. No eruption has occurred since 1219—in fact it has ceased to be a volcano at all.”

After this what more could I say? Yes—I thought of another objection.

“But what is all this about Scartaris and the kalends of July——?”

My uncle reflected deeply. Presently he gave forth the result of his reflections in a sententious tone.

“What appears obscure to you, to me is light. This very phrase shows how particular Saknussemm is in his directions. The Sneffels’ mountain has many craters. He is careful therefore to point the exact one which is the highway into the Interior of the Earth. He lets us know, for this purpose, that about the end of the month of June, the shadow of Mount Scartaris falls upon the one crater. There can be no doubt about the matter.”

My uncle had an answer for everything.

“I accept all your explanations,” I said, “and Saknussemm is right. He found out the entrance to the bowels of the earth, he has indicated correctly, but that he or any one else ever followed up the discovery, is madness to suppose.”

“Why so, young man?”

“All scientific teaching, theoretical and practical, shows it to be impossible.”

“I care nothing for theories,” retorted my uncle.

“But is it not well-known that heat increases one degree for every seventy feet you descend into the earth? which

gives a fine idea of the central heat. All the matters which compose the globe are in a state of incandescence; even gold, platinum, and the hardest rocks are in a state of fusion. What would become of us?"

"Don't be alarmed at the heat, my boy."

"How so?"

"Neither you nor anybody else know anything about the real state of the earth's interior. All modern experiments tend to explode the older theories. Were any such heat to exist, the upper crust of the earth would be shattered to atoms, and the world would be at an end."

A long, learned and not uninteresting discussion followed, which ended in this wise:—

"I do not believe in the dangers and difficulties which you, Henry, seem to multiply; and the only way to learn, is like Arne Saknussemm, to go and see."

"Well," cried I, overcome at last, "let us go and see. Though how we can do that in the dark is another mystery."

"Fear nothing. We shall overcome these, and many other difficulties. Besides, as we approach the Centre, I expect to find it luminous—"

"Nothing is impossible."

"And now that we have come to a thorough understanding, not a word to any living soul. Our success depends on secrecy and despatch."

Thus ended our memorable conference, which roused a perfect fever in me. Leaving my uncle, I went forth like one possessed. Reaching the banks of the Elbe, I began to think. Was all I had heard really and truly possible? Was my uncle in his sober senses, and could the interior of the earth be reached? Was I the victim of a madman, or was he a discoverer of rare courage and grandeur of conception?

To a certain extent I was anxious to be off. I was afraid my enthusiasm would cool. I determined to pack

up at once. At the end of an hour, however, on my way home, I found that my feelings had very much changed.

"I'm all abroad," I cried; "'tis a nightmare—I must have dreamed it."

At this moment I came face to face with Gretchen, whom I warmly embraced.

"So you have come to meet me," she said; "how good of you. But what is the matter?"

Well, it was no use mincing the matter, I told her all. She listened with awe, and for some minutes she could not speak.

"Well?" I at last said, rather anxiously.

"What a magnificent journey. If I were only a man! A journey worthy of the nephew of Professor Hardwigg. I should look upon it as an honor to accompany him."

"My dear Gretchen, I thought you would be the first to cry out against this mad enterprise."

"No; on the contrary, I glory in it. It is magnificent, splendid—an idea worthy of my father. Henry Lawson, I envy you."

This was, as it were, conclusive. The final blow of all.

When we entered the house we found my uncle surrounded by workmen and porters, who were packing up. He was pulling and hauling at a bell.

"Where have you been wasting your time? Your portmanteau is not packed—my papers are not in order—the precious tailor has not brought my clothes, nor my gaiters—the key of my carpet bag is gone!"

I looked at him stupefied. And still he tugged away at the bell.

"We are really off, then?" I said.

"Yes—of course, and yet you go out for a stroll, unfortunate boy!"

"And when do we go?"

"The day after to-morrow, at daybreak."

I heard no more; but darted off to my little bed-chamber and locked myself in. There was no doubt about it now. My uncle had been hard at work all the afternoon. The garden was full of ropes, rope-ladders, torches, gourds, iron clamps, crow-bars, alpenstocks, and pickaxes—enough to load ten men.

I passed a terrible night. I was called early the next day to learn that the resolution of my uncle was unchanged and irrevocable. I also found my cousin and affianced wife as warm on the subject as was her father.

Next day, at five o'clock in the morning, the post-chaise was at the door. Gretchen and the old cook received the keys of the house; and, scarcely pausing to wish any one good-bye, we started on our adventurous journey into the Centre of the Earth.

CHAPTER V.

FIRST LESSONS IN CLIMBING.

AT Altona, a suburb of Hamburg, is the Chief Station of the Kiel railway, which was to take us to the shores of the Belt. In twenty minutes from the moment of our departure we were in Holstein, and our carriage entered the station. Our heavy luggage was taken out, weighed, labelled, and placed in a huge van. We then took our tickets, and exactly at seven o'clock were seated opposite each other in a first-class railway carriage.

My uncle said nothing. He was too busy examining his papers, among which of course was the famous parchment, and some letters of introduction from the Danish consul, which were to pave the way to an introduction to the Governor of Iceland. My only amusement was looking out of the window. But as we passed through a flat though fertile country, this occupation was slightly monotonous. In three hours we reached Kiel, and our baggage was at once transferred to the steamer.

We had now a day before us, a delay of about ten hours. Which fact put my uncle in a towering passion. We had nothing to do but to walk about the pretty town and bay. At length, however, we went on board, and at half past ten were steaming down the Great Belt. It was a dark night, with a strong breeze and a rough sea, nothing being visible but the occasional fires on shore, with here and there a lighthouse. At seven in the morning we left Korsör, a little town on the western side of Seeland.

Here we took another railway, which in three hours brought us to the capital, Copenhagen, where, scarcely taking time for refreshment, my uncle hurried out to pre-

sent one of his letters of introduction. It was to the director of the Museum of Antiquities, who having been informed that we were tourists bound for Iceland, did all he could to assist us. One wretched hope sustained me now. Perhaps no vessel was bound for such distant parts.

Alas! a little Danish schooner, the *Valkyrie*, was to sail on the second of June for Reykjavik. The captain, M. Bjarne, was on board, and was rather surprised at the energy and cordiality with which his future passenger shook him by the hand. To him a voyage to Iceland was merely a matter of course. My uncle, on the other hand, considered the event of sublime importance. The honest sailor took advantage of the Professor's enthusiasm to double the fare.

"On Tuesday morning at seven o'clock be on board," said M. Bjarne, handing us our receipts.

"Excellent! Capital! Glorious!" remarked my uncle as we sat down to a late breakfast; "refresh yourself, my boy, and we will take a run through the town."

Our meal concluded, we went to the Kongens-Nye-Torw; to the king's magnificent palace; to the beautiful bridge over the canal near the Museum; to the immense cenotaph of Thorwaldsen with its hideous naval groups; to the castle of Rosenberg; and to all the other lions of the place,—none of which my uncle even saw, so absorbed was he in his anticipated triumphs.

But one thing struck his fancy, and that was a certain singular steeple situated on the Island of Amak, which is the south-east quarter of the city of Copenhagen. My uncle at once ordered me to turn my steps that way, and accordingly we went on board the steam ferry boat which does duty on the canal, and very soon reached the noted dockyard quay.

In the first instance we crossed some narrow streets, where we met numerous groups of galley slaves, with parti-

colored trousers, grey and yellow, working under the orders and the sticks of severe task-masters, and finally reached the Vor-Frelser's-Kirk.

This church exhibited nothing remarkable in itself; in fact, the worthy Professor had only been attracted to it by one circumstance, which was, that its rather elevated steeple started from a circular platform, after which there was an exterior staircase, which wound round to the very summit.

"Let us ascend," said my uncle.

"But I never could climb church towers," I cried, "I am subject to dizziness in my head."

"The very reason why you should go up. I want to cure you of a bad habit."

"But my good sir——"

"I tell you to come. What is the use of wasting so much valuable time?"

It was impossible to dispute the dictatorial commands of my uncle. I yielded with a groan. On payment of a fee, a verger gave us the key. He, for one, was not partial to the ascent. My uncle at once showed me the way, running up the steps like a school-boy. I followed as well as I could, though no sooner was I outside the tower, than my head began to swim. There was nothing of the eagle about me. The earth was enough for me, and no ambitious desire to soar ever entered my mind. Still things did not go badly until I had ascended 150 steps, and was near the platform, when I began to feel the rush of cold air. I could scarcely stand, when clutching the railings, I looked upwards. The railing was frail enough, but nothing to those which skirted the terrible winding staircase, that appeared, from where I stood, to ascend to the skies.

"Now then, Henry."

"I can't do it!" I cried, in accents of despair.

"Are you, after all, a coward, sir?" said my uncle in a pitiless tone. "Go up, I say!"

To this there was no reply possible. And yet the keen air acted violently on my nervous system; sky, earth, all seemed to swim round; while the steeple rocked like a ship. My legs gave way like those of a drunken man. I crawled upon my hands and knees; I hauled myself up slowly, crawling like a snake. Presently I closed my eyes, and allowed myself to be dragged upwards.

"Look around you," said my uncle, in a stern voice, "heaven knows what profound abysses you may have to look down. This is excellent practice."

Slowly, and shivering all the while with cold, I opened my eyes. What then did I see? My first glance was upwards at the cold fleecy clouds, which as by some optical delusion appeared to stand still, while the steeple, the weathercock, and our two selves were carried swiftly along. Far away on one side could be seen the grassy plain, while on the other lay the sea bathed in translucent light. The Sund, or Sound as we call it, could be discovered beyond the point of Elsinore, crowded with white sails, which, at that distance, looked like the wings of sea-gulls; while to the east could be made out the far-off coast of Sweden. The whole appeared a magic panorama.

But faint and bewildered as I was, there was no remedy for it. Rise and stand up I must. Despite my protestations my first lesson lasted quite an hour. When, nearly two hours later, I reached the bosom of mother earth, I was like a rheumatic old man bent double with pain.

"Enough for one day," said my uncle, rubbing his hands, "we will begin again to-morrow."

There was no remedy. My lessons lasted five days, and at the end of that period, I ascended blithely enough, and found myself able to look down into the depths below without even winking, and with some degree of pleasure.

CHAPTER VI.

OUR VOYAGE TO ICELAND.

THE hour of departure came at last. The night before, the worthy Mr. Thompson brought us the most cordial letters of introduction for Count Trampe, Governor of Iceland, for M. Pictursson, coadjutor to the bishop, and for M. Finsen, mayor of the town of Reykjawik. In return, my uncle nearly crushed his hands, so warmly did he shake them.

On the second of the month, at two in the morning, our precious cargo of luggage was taken on board the good ship *Valkyrie*. We followed, and were very politely introduced by the captain to a small cabin with two standing bed places, neither very well ventilated nor very comfortable. But in the cause of science men are expected to suffer.

“Well, and have we a fair wind?” cried my uncle, in his most mellifluous accents.

“An excellent wind!” replied Captain Bjarne; “we shall leave the Sound, going free with all sails set.”

A few minutes afterwards, the schooner started before the wind, under all the canvas she could carry, and entered the channel. An hour later, the capital of Denmark seemed to sink into the waves, and we were at no great distance from the coast of Elsinore. My uncle was delighted; for myself, moody and dissatisfied, I appeared almost to expect a glimpse of the ghost of Hamlet.

“Sublime madman,” thought I, “you doubtless, would approve our proceedings. You might perhaps even follow us to the centre of the earth, there to resolve your eternal doubts.”

But no ghost, or anything else appeared upon the ancient walls. The fact is, the castle is much later than the time of the heroic prince of Denmark. It is now the residence of the keeper of the Strait of the Sound, and through that Sound more than fifteen thousand vessels of all nations pass every year.

The castle of Kronborg soon disappeared in the murky atmosphere, as well as the tower of Helsingborg, which raises its head on the Swedish Bank. And here the schooner began to feel in earnest the breezes of the Cattegat. The *Valkyrie* was swift enough, but with all sailing boats there is the same uncertainty. Her cargo was coal, furniture, pottery, woolen clothing, and a load of corn. As usual, the crew was small, five Danes doing the whole of the work.

"How long will the voyage last?" asked my uncle.

"Well, I should think about ten days," replied the skipper, "unless, indeed, we meet with some north-east gales among the Faroe Islands.

"At all events, there will be no very considerable delay," cried the impatient Professor.

"No, Mr. Hardwigg," said the captain, "no fear of that. At all events, we shall get there some day."

Towards evening the schooner doubled Cape Skagen, the northernmost part of Denmark, crossed the Skager-Rak during the night—skirted the extreme point of Norway through the gut of Cape Lindness, and then reached the Northern Seas. Two days later we were not far from the coast of Scotland, somewhere near what Danish sailors call Peterhead, and then the *Valkyrie* stretched out direct for the Faroe Islands, between Orkney and Shetland. Our vessel now felt the full force of the ocean waves, and the wind shifting, we with great difficulty made the Faroe Isles. On the eighth day, the captain made out Myganness, the westernmost of the Isles, and from that moment

headed direct for Portland, a cape on the southern shores of the singular island for which we were bound.

The voyage offered no incident worthy of record. I bore it very well, but my uncle to his great annoyance, and even shame, was remarkably sea-sick! This *mal de mer* troubled him the more, that it prevented him from questioning Captain Bjarne as to the subject of Sneffels, as to the means of communication, and the facilities of transport. All these explanations he had to adjourn to the period of his arrival. His time meanwhile, was spent lying in bed groaning, and dwelling anxiously on the hoped-for termination of the voyage. I didn't pity him.

On the eleventh day we sighted Cape Portland, over which towered Mount Myrdals Yokul, which, the weather being clear, we made out very readily. The cape itself is nothing but a huge mount of granite standing naked and alone to meet the Atlantic waves. The *Valkyrie* kept off the coast, steering to the westward. On all sides were to be seen whole "schools" of whales and sharks. After some hours we came in sight of a solitary rock in the ocean, forming a mighty vault, through which the foaming waves poured with intense fury. The islets of Westman appeared to leap from the ocean, being so low in the water as scarcely to be seen until you were right upon them. From that moment the schooner was steered to the westward in order to round Cape Reykjaness, the western point of Iceland.

My uncle, to his great disgust, was unable even to crawl on deck, so heavy a sea was on, and thus lost the first view of the Land of Promise. Forty-eight hours later, after a storm which drove us far to sea under bare poles, we came once more in sight of land, and were boarded by a pilot, who, after three hours of dangerous navigation, brought the schooner safely to an anchor in the bay of Faxa before Reykjawik.

My uncle came out of his cabin pale, haggard, thin, but full of enthusiasm, his eyes dilated with pleasure and satisfaction. Nearly the whole population of the town was on foot to see us land. The fact was, that scarcely any one of them but expected some goods by the periodical vessel.

Professor Hardwigg was in haste to leave his prison, or rather as he called it, his hospital; but before he attempted to do so, he caught hold of my hand, led me to the quarter-deck of the schooner, took my arm with his left hand, and pointed inland with his right, over the northern part of the bay, to where rose a high two-peaked mountain—a double cone covered with eternal snow.

“Behold,” he whispered in an awe-stricken voice, “behold—Mount Sneffels!”

Then without further remark, he put his finger to his lips, frowned darkly, and descended into the small boat which awaited us. I followed, and in a few minutes we stood upon the soil of mysterious Iceland!

Scarcely were we fairly on shore when there appeared before us a man of excellent appearance, wearing the costume of a military officer. He was, however, but a civil servant, a magistrate, the governor of the island—Baron Trampe. The Professor knew whom he had to deal with. He therefore handed him the letters from Copenhagen, and a brief conversation in Danish followed, to which I of course was a stranger, and for a very good reason, for I did not know the language in which they conversed. I afterwards heard, however, that Baron Trampe placed himself entirely at the beck and call of Professor Hardwigg.

My uncle was most graciously received by M. Finsen, the mayor, who as far as costume went, was quite as military as the governor, but also from character and occupation quite as pacific. As for his coadjutor, M. Picturnsson, he was absent on an episcopal visit to the

northern portion of the diocese. We were therefore compelled to defer the pleasure of being presented to him. His absence was, however, more than compensated by the presence of M. Fridriksson, Professor of natural science in the college of Reykjawik, a man of invaluable ability. This modest scholar spoke no languages save Icelandic and Latin. When, therefore, he addressed himself to me in the language of Horace, we at once came to understand one another. He was, in fact, the only person that I did thoroughly understand during the whole period of my residence in this benighted island.

Out of three rooms of which his house was composed, two was placed at our service, and in a few hours we were installed with all our baggage, the amount of which rather astonished the simple inhabitants of Reykjawik.

"Now, Harry," said my uncle, rubbing his hands, "all goes well, the worse difficulty is now over."

"How the worse difficulty over?" I cried in fresh amazement.

"Doubtless. Here we are in Iceland. Nothing more remains but to descend into the bowels of the earth."

"Well, sir, to a certain extent you are right. We have only to go down—but, as far as I am concerned, that is not the question. I want to know how we are to get up again."

"That is the least part of the business, and does not in any way trouble me. In the meantime, there is not an hour to lose. I am about to visit the public library. Very likely I may find there some manuscripts from the hand of Saknussem. I shall be glad to consult them."

"In the meanwhile," I replied, "I will take a walk through the town. Will you not likewise do so?"

"I feel no interest in the subject," said my uncle. "What for me is curious in this island, is not what is above the surface, but what is below."

I bowed by way of reply, put on my hat and furred cloak, and went out.

It was not an easy matter to lose oneself in the two streets of Reykjawik; I had therefore no need to ask my way. The town lies on a flat and marshy plain, between two hills. A vast field of lava skirts it on one side, falling away in terraces towards the sea. On the other hand is the large bay of Faxa, bordered on the north by the enormous glacier of Sneffels, and in which bay the *Valkyrie* was then the only vessel at anchor. Generally there was one or two English or French gunboats, to watch and protect the fisheries in the offing. They were now, however, absent on duty.

The longest of the streets of Reykjawik runs parallel to the shore. In this street the merchants and traders live in wooden huts made with beams of wood, painted red,—mere log huts, such as you find in the wilds of America. The other street, situated more to the west, runs towards a little lake between the residences of the bishop and the other personages not engaged in commerce.

I had soon seen all I wanted of these weary and dismal thoroughfares. Here and there was a strip of discolored turf, like an old worn-out bit of woollen carpet; and now and then a bit of kitchen garden, in which grew potatoes, cabbage, and lettuces, almost diminutive enough to suggest the idea of Lilliput.

In the centre of the new commercial street, I found the public cemetery, enclosed by an earthen wall. Though not very large, it appeared not likely to be filled for centuries. From hence I went to the house of the Governor—a mere hut in comparison with the Mansion House of Hamburg—but a palace alongside the other Icelandic houses. Between the little lake and the town was the church, built in simple Protestant style, and composed of calcined stones, thrown up by volcanic action. I have not

the slightest doubt that in high winds, its red tiles were blown out, to the great annoyance of the pastor and congregation. Upon an eminence close at hand was the national school, in which were taught Hebrew, English, French and Danish.

In three hours my tour was complete. The general impression upon my mind was sadness. No trees, no vegetation, so to speak—on all sides volcanic peaks—the huts of turf and earth—more like roofs than houses. Thanks to the heat of these residences, grass grows on the roof, which grass is carefully cut for hay. I saw but few inhabitants during my excursion, but I met a crowd on the beach, drying, salting and loading cod-fish, the principal article of exportation. The men appeared robust but heavy; fair-haired like Germans, but of pensive mien—exiles of a higher scale in the ladder of humanity than the Esquimaux, but, I thought, much more unhappy, since with superior perceptions they are compelled to live within the limits of the Polar Circle.

Sometimes they gave vent to a convulsive laugh, but by no chance did they smile. Their costume consists of a coarse capote of black wool, known in Scandinavian countries as the “vadmél,” a broad-brimmed hat, trousers of red serge, and a piece of leather tied with strings for a shoe—a coarse kind of moccasin. The women, though sad-looking and mournful, had rather agreeable features, without much expression. They wear a bodice and petticoat of sombre vadmél. When unmarried they wear a little brown knitted cap over a crown of plaited hair; but when married, they cover their heads with a colored handkerchief, over which they tie a white scarf.

CHAPTER VII.

CONVERSATION AND DISCOVERY.

WHEN I returned, dinner was ready. This meal was devoured by my worthy relative with avidity and voracity. His shipboard diet had turned his interior into a perfect gulf. The repast, which was more Danish than Icelandic, was in itself nothing, but the excessive hospitality of our host made us enjoy it doubly.

The conversation turned upon scientific matters, and M. Fridriksson asked my uncle what he thought of the public library.

"Library, sir?" cried my uncle; "it appears to me a collection of useless odd volumes, and a beggarly amount of empty shelves."

"What!" cried M. Fridriksson; "why, we have eight thousand volumes of most rare and valuable works—some in the Scandinavian language, besides all the new publications from Copenhagen."

"Eight thousand volumes, my dear sir—why, where are they?" cried my uncle.

"Scattered over the country, Professor Hardwigg. We are very studious, my dear sir, though we do live in Iceland. Every farmer, every laborer, every fisherman can both read and write—and we think that books instead of being locked up in cupboards, far from the sight of students, should be distributed as widely as possible. The books of our library are therefore, passed from hand to hand without returning to the library shelves perhaps for years."

"Then when foreigners visit you, there is nothing for them to see?"

“Well, sir, foreigners have their own libraries, and our first consideration is, that our humbler classes should be highly educated. Fortunately, the love of study is innate in the Icelandic people. In 1816 we founded a Literary Society and Mechanics’ Institute; many foreign scholars of eminence are honorary members; we publish books destined to educate our people, and these books have rendered valuable services to our country. Allow me to have the honor, Professor Hardwigg, to enrol you as an honorary member?”

My uncle, who already belonged to nearly every literary and scientific institution in Europe, immediately yielded to the amiable wishes of good M. Fridriksson.

“And now,” he said, after many expressions of gratitude and good-will, “if you will tell me what books you expected to find, perhaps I may be of some assistance to you.”

I watched my uncle keenly. For a minute or two he hesitated, as if unwilling to speak; to speak openly was, perhaps, to unveil his projects. Nevertheless, after some reflection, he made up his mind.

“Well, M. Fridriksson,” he said in an easy, unconcerned kind of way. “I was desirous of ascertaining, if among other valuable works, you had any of the learned Arne Saknussem.”

“Arne Saknussem!” cried the Professor of Reykjavik; “you speak of one of the most distinguished scholars of the sixteenth century, of the great naturalist, the great alchemist, the great traveller.”

“Exactly so.”

“One of the most distinguished men connected with Icelandic science and literature.”

“As you say, sir——”

“A man illustrious above all.”

“Yes, sir, all this is true, but his works?”

"We have none of them."

"Not in Iceland?"

"There are none in Iceland or elsewhere," answered the other, sadly.

"Why so?"

"Because Arne Saknussem was persecuted for heresy, and in 1573 his works were publicly burnt at Copenhagen, by the hands of the common hangman."

"Very good! capital!" murmured my uncle, to the great astonishment of the worthy Iclander.

"You said, sir——"

"Yes, yes, all is clear, I see the link in the chain; everything is explained, and I now understand why Arne Saknussem, put out of court, forced to hide his magnificent discoveries, was compelled to conceal beneath the veil of an incomprehensible cryptograph, the secret——"

"What secret?"

"A secret—which," stammered my uncle.

"Have you discovered some wonderful manuscript?" cried M. Fridriksson.

"No, no, I was carried away by my enthusiasm. A mere supposition."

"Very good, sir. But, really, to turn to another subject, I hope you will not leave our island without examining into its mineralogical riches."

"Well, the fact is, I am rather late. So many learned men have been here before me."

"Yes, yes, but there is still much to be done," cried M. Fridriksson.

"You think so," said my uncle, his eyes twinkling with hidden satisfaction.

"Yes, you have no idea how many unknown mountains, glaciers, volcanoes there are which remain to be studied. Without moving from where we sit, I can show you one. Yonder on the edge of the horizon, you see Sneffels."

"Oh yes, Sneffels," said my uncle.

"One of the most curious volcanoes in existence, the crater of which has been rarely visited."

"Extinct?"

"Extinct, any time these five hundred years," was the ready reply.

"Well," said my uncle, who dug his nails into his flesh, and pressed his knees tightly together to prevent himself leaping up with joy. "I have a great mind to begin my studies with an examination of the geological mysteries of this Mount Seffel—Feisel—what do you call it?"

"Sneffels, my dear sir."

This portion of the conversation took place in Latin, and I therefore understood all that had been said. I could scarcely keep my countenance when I found my uncle so cunningly concealing his delight and satisfaction. I must confess that his artful grimaces, put on to conceal his happiness, made him look like a new Mephistopheles.

"Yes, yes," he continued, "your proposition delights me. I will endeavor to climb to the summit of Sneffels, and, if possible, will descend into its crater."

"I very much regret," continued M. Fridriksson, "that my occupation will entirely preclude the possibility of my accompanying you. It would have been both pleasurable and profitable if I could have spared the time."

"No, no, a thousand times no," cried my uncle. "I do not wish to disturb the serenity of any man. I thank you, however, with all my heart. The presence of one so learned as yourself, would no doubt have been most useful, but the duties of your office and profession before everything."

In the innocence of his simple heart, our host did not perceive the irony of these remarks.

"I entirely approve your project," continued the Ic-lander, after some further remarks. "It is a good idea to

begin by examining this volcano. You will make a harvest of curious observations. In the first place, how do you propose to get to Sneffels?"

"By sea. I shall cross the bay. Of course that is the most rapid route."

"Of course. But still it cannot be done."

"Why?"

"We have not an available boat in all Reykjawik," replied the other.

"What is to be done?"

"You must go by land along the coast. It is longer, but much more interesting."

"Then I must have a guide."

"Of course; and I have your very man."

"Somebody on whom I can depend."

"Yes, an inhabitant of the peninsula on which Sneffels is situated. He is a very shrewd and worthy man, with whom you will be pleased. He speaks Danish like a Dane."

"When can I see him—to-day?"

"No, to-morrow; he will not be here before."

"To-morrow be it," replied my uncle, with a deep sigh.

The conversation ended by compliments on both sides. During the dinner my uncle had learned much as to the history of Arne Saknussemm, the reasons for his mysterious and hieroglyphical document. He also became aware that his host would not accompany him on his adventurous expedition, and that next day we should have a guide.

CHAPTER VIII.

THE EIDER-DOWN HUNTER.—OFF AT LAST.

THAT evening I took a brief walk on the shore near Reykjavik, after which I returned to an early sleep on my bed of coarse planks, where I slept the sleep of the just. When I awoke I heard my uncle speaking loudly in the next room. I rose hastily and joined him. He was talking in Danish with a man of tall stature, and of perfectly Herculean build. This man appeared to be possessed of very great strength. His eyes, which started rather prominently from a very large head, the face belonging to which was simple and naïve, appeared very quick and intelligent. Very long hair, which even in England would have been accounted exceedingly red, fell over his athletic shoulders. This native of Iceland was active and supple in appearance, though he scarcely moved his arms, being in fact one of those men who despise the habit of gesticulation common to southern people.

Everything in this man's manner revealed a calm and phlegmatic temperament. There was nothing indolent about him, but his appearance spoke of tranquillity. He was one of those who never seemed to expect anything from anybody, who liked to work when he thought proper, and whose philosophy nothing could astonish or trouble.

I began to comprehend his character, simply from the way in which he listened to the wild and impassioned verbiage of my worthy uncle. While the excellent Professor spoke sentence after sentence, he stood with folded arms, utterly still, motionless to all my uncle's gesticulations. When he wanted to say No he moved his head from left to

right; when he acquiesced he nodded, so slightly that you could scarcely see the undulation of his head. This economy of motion was carried to the length of avarice.

Judging from his appearance I should have been a long time before I had suspected him to be what he was, a mighty hunter. Certainly his manner was not likely to frighten the game. How, then, did he contrive to get at his prey?

My surprise was slightly modified when I knew that this tranquil and solemn personage, was only a hunter of the eider-duck, the down of which is, after all, the greatest source of the Icelanders' wealth.

In the early days of summer, the female of the eider, a pretty sort of duck, builds its nest amid the rocks of the fjords—the name given to all narrow gulfs in Scandinavian countries—with which every part of the island is indented. No sooner has the eider-duck made her nest than she lines the inside of it with the softest down from her breast. Then comes the hunter or trader, taking away the nest; the poor bereaved female begins her task over again, and this continues as long as any eider-down is to be found.

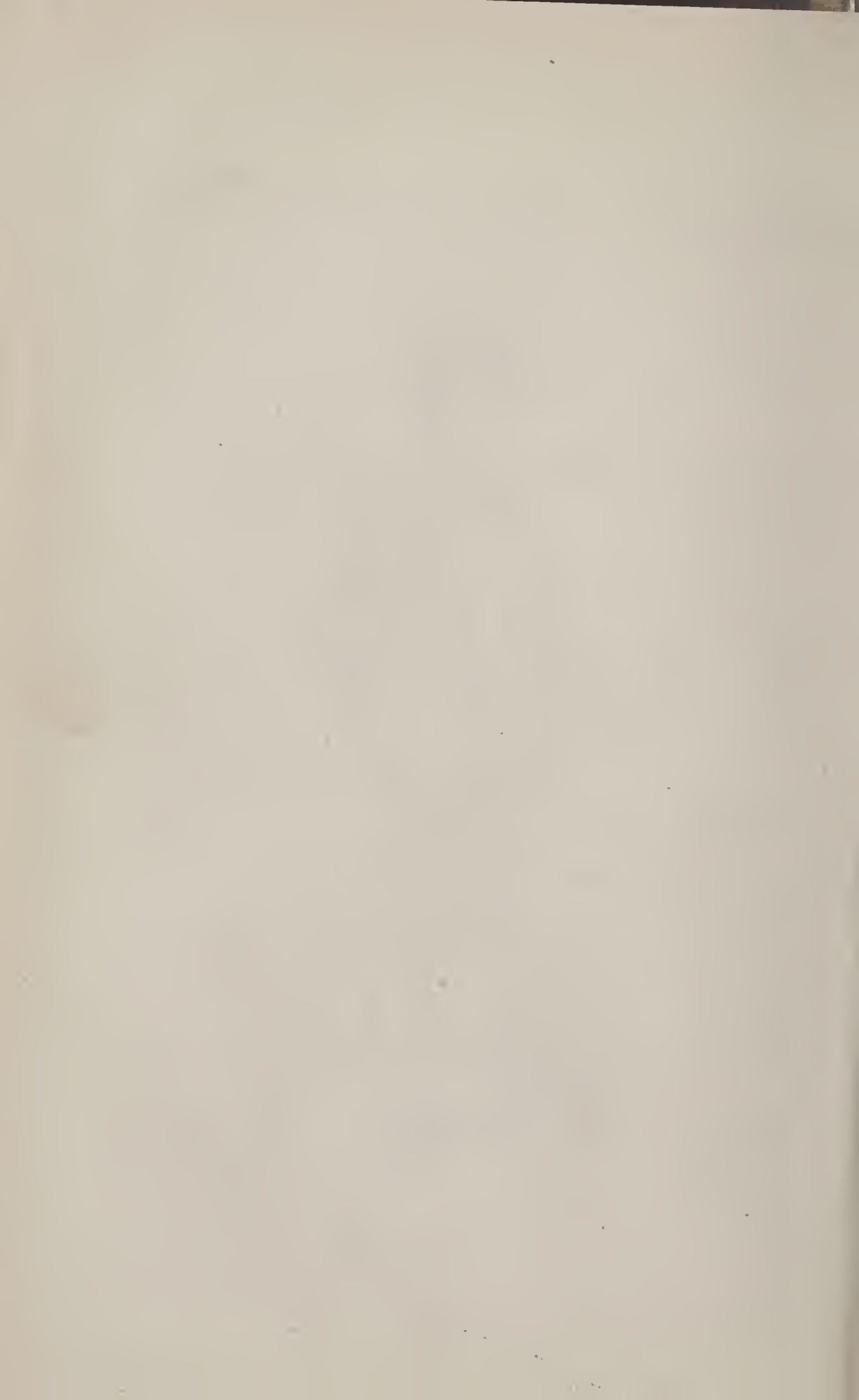
When she can find no more the male bird sets to work to see what he can do. As, however, his down is not so soft, and has therefore no commercial value, the hunter does not take the trouble to rob him of his nest-lining. The nest is accordingly finished, the eggs are laid, the little ones are born, and next year the harvest of eider-down is again collected.

Now, as the eider-duck never selects steep rocks or aspects to build its nest, but rather sloping and low cliffs near to the sea, the Icelandic hunter can carry on his trade operations without much difficulty. He is like a farmer who has neither to plow, to sow, nor to harrow, only to collect his harvest.*

* The birds, however, are not always so accommodating. They are found



HANS BJELKE, THE GUIDE.



This grave, sententious, silent person, as phlegmatic as an Englishman on the French stage, was named Hans Bjelke. He had called upon us in consequence of the recommendation of M. Fridriksson. He was, in fact, our future guide. It struck me that had I sought the world over, I could not have found a greater contradiction to my impulsive uncle.

They, however, readily understood one another. Neither of them had any thought about money; one was ready to take all that was offered him, the other ready to offer anything that was asked. It may readily be conceived, then, that an understanding was soon come to between them.

Now, the understanding was, that he was to take us to the village of Stapi, situated on the southern slope of the peninsula of Sneffels, at the very foot of the volcano. Hans, the guide, told us the distance was about twenty-two miles, a journey which my uncle supposed would take about two days.

But when my uncle came to understand that they were Danish miles, of eight thousand yards each, he was obliged to be more moderate in his ideas, and, considering the horrible roads we had to follow, to allow eight or ten days for the journey.

Four horses were prepared for us, two to carry the baggage, and two to bear the important weight of myself and uncle. Hans declared that nothing ever would make him climb on the back of any animal. He knew every inch of that part of the coast, and promised to take us the very shortest way.

His engagement with my uncle was by no means to

in the southern part of England as a winter visitant, but in the more northern part of our isle, and in the north of Scotland remain all the year. One of our ablest naturalists says: "Taking these nests is a regular business not unattended with risk, on account of the precipitous localities in which the eider-duck often breeds." Again, "The eider is a shy, retiring bird placing its nest on islands and rocks projecting well into the sea."

cease with our arrival at Stapi; he was further to remain in his service during the whole time required for the completion of his scientific investigations, at the fixed salary of three rix-dollars a week, being exactly fourteen shillings and twopence, minus one farthing, English currency. One stipulation, however, was made by the guide—the money was to be paid to him every Saturday night, failing which, his engagement was at an end.

The day of our departure was fixed. My uncle wished to hand the eider-down hunter an advance, but he refused in one emphatic word—

“*Efter.*”

Which being translated from Icelandic into plain English means—After.

The treaty concluded, our worthy guide retired without another word.

“A splendid fellow,” said my uncle; “only he little suspects the marvellous part he is about to play in the history of the world.”

“You mean, then,” I cried in amazement, “that he should accompany us?”

“To the Interior of the Earth, yes;” replied my uncle. “Why not?”

There were yet forty-eight hours to elapse before we made our final start. To my great regret, our whole time was taken up in making preparations for our journey. All our industry and ability were devoted to packing every object in the most advantageous manner—the instruments on one side, the arms on the other, the tools here and the provisions there. There were, in fact, four distinct groups.

The instruments were of course of the best manufacture:—

1. A centigrade thermometer of Eizel, counting up to 150 degrees, which to me did not appear half enough—or too much. Too hot by half, if the degree of heat was to

ascend so high—in which case we should certainly be cooked—not enough, if we wanted to ascertain the exact temperature of springs or metal in a state of fusion.

2. A *manometer* worked by compressed air, an instrument used to ascertain the upper atmospheric pressure on the level of the ocean. Perhaps a common barometer would not have done as well, the atmospheric pressure being likely to increase in proportion as we descended below the surface of the earth.

3. A first-class chronometer made by Boissonnas, of Geneva, set at the meridian of Hamburg, from which Germans calculate, as the English do from Greenwich, and the French from Paris.

4. Two compasses, one for horizontal guidance, the other to ascertain the dip.

5. A night glass.

6. Two Ruhmkorf's coils, which, by means of a current of electricity, would ensure us a very excellent, easy carried, and certain means of obtaining light.

7. A voltaic battery on the newest principle.*

*Thermometer (*thermos*, hot, and *metron*, measure); an instrument for measuring the temperature of the air.—Manometer (*manos*, rare, and *metron*, measure); an instrument to show the density or rarity of gases.—Chronometer (*chronos*, time, and *metron*, measure) a time measurer, or superior watch.—Ruhmkorf's coil, an instrument for producing currents of induced electricity of great intensity. It consists of a coil of copper wire, insulated by being covered with silk, surrounded by another coil of fine wire, also insulated, in which a momentary current is induced when a current is passed through the inner coil from a voltaic battery. When the apparatus is in action, the gas becomes luminous, and produces a white and continued light. The battery and wire are carried in a leather bag, which the traveller fastens by a strap to his shoulders. The lantern is in front, and enables the benighted wanderer to see in the most profound obscurity. He may venture without fear of explosion into the midst of the most inflammable gases, and the lantern will burn beneath the deepest waters. M. Ruhmkorf, an able and learned chemist, discovered the induction coil. In 1864 he obtained the great French prize £2,000 for this ingenious application of electricity.—A voltaic battery, so called from Volta, its designer, is an apparatus consisting of a series of metal plates arranged in pairs and subjected to the action of saline solutions for producing currents of electricity.

Our arms consisted of two rifles, with two revolving six-shooters. Why these arms were provided it was impossible for me to say. I had every reason to believe that we had neither wild beasts nor savage natives to fear. My uncle, on the other hand, was quite as devoted to his arsenal as to his collection of instruments, and above all was very careful with his provision of fulminating or gun cotton, warranted to keep in any climate, and of which the expansive force was known to be greater than that of ordinary gunpowder.

Our tools consisted of two pickaxes, two crowbars, a silken ladder, three iron-shod Alpine poles, a hatchet, a hammer, a dozen wedges, some pointed pieces of iron, and a quantity of strong rope. You may conceive that the whole made a tolerable parcel, especially when I mention that the ladder itself was three hundred feet long !

Then there came the important question of provisions. The hamper was not very large but tolerably satisfactory, for I knew that in concentrated essence of meat and biscuit there was enough to last six months. The only liquid provided by my uncle was scheidam. Of water, not a drop. We had, however, an ample supply of gourds, and my uncle counted on finding water, and enough to fill them, as soon as we commenced our downward journey.

My remarks as to the temperature, the quality, and even as to the possibility of none being found, remained wholly without effect.

To make up the exact list of our travelling gear—for the guidance of future travellers—I will add, that we carried a medicine and surgical chest with all apparatus necessary for wounds, fractures and blows ; lint, scissors, lancets—in fact, a perfect collection of horrible-looking instruments ; a number of phials containing ammonia, alcohol, ether, goulard water, aromatic vinegar, in fact, every possible and impossible drug—finally, all the materials for working the Ruhmkorf coil !

My uncle had also been careful to lay in a goodly supply of tobacco, several flasks of very fine gunpowder, boxes of tinder, besides a large belt crammed full of notes and gold. Good boots rendered water-tight were to be found to the number of six in the tool-box.

“My boy, with such clothing, with such boots, and such general equipments,” said my uncle, in a state of rapturous delight; “we may hope to travel far.”

It took a whole day to put all these matters in order. In the evening we dined with Baron Trampe, in company with the Mayor of Reykjawik, and Doctor Hyaltalin, the great medical man of Iceland. M. Fridriksson was not present, and I was afterwards sorry to hear that he and the governor did not agree on some matters connected with the administration of the island. Unfortunately, the consequence was, that I did not understand a word that was said at dinner—a kind of semi-official reception. One thing I can say, my uncle never left off speaking.

The next day our labor came to an end. Our worthy host delighted my uncle, Professor Hardwigg, by giving him a good map of Iceland, a most important and precious document for a mineralogist.

Our last evening was spent in a long conversation with M. Fridriksson, whom I liked very much—the more that I never expected to see him or any one else again. After this agreeable way of spending an hour or so, I tried to sleep. In vain; with the exception of a few dozes, my night was miserable.

At five o'clock in the morning I was awakened from the only real half hour's sleep of the night, by the loud neighing of horses under my window. I hastily dressed myself and went down into the street. Hans was engaged in putting the finishing stroke to our baggage, which he did in a silent, quiet way that won my admiration, and yet he did it admirably well. My uncle wasted a great deal

of breath in giving him directions, but worthy Hans took not the slightest notice of his words.

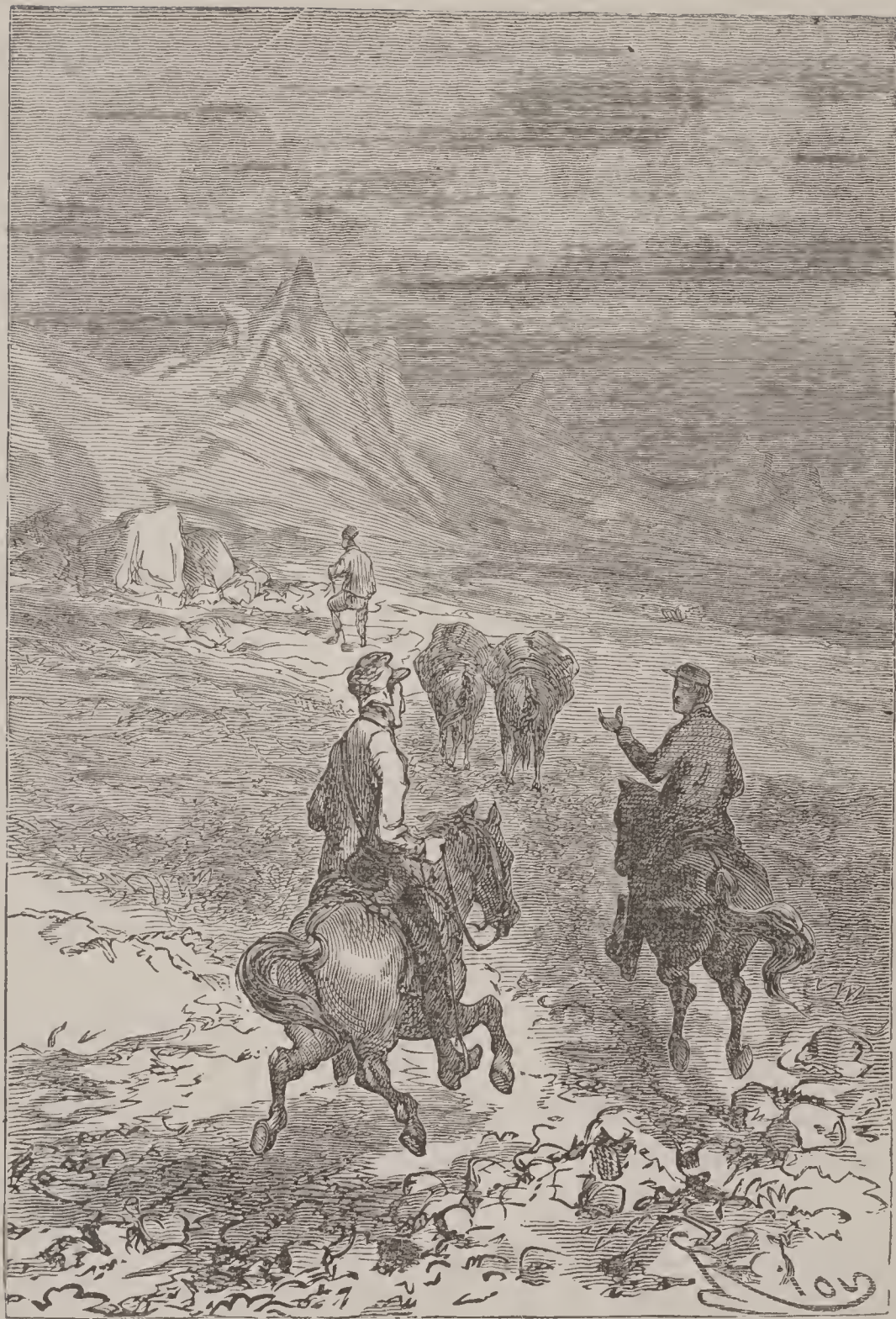
At six o'clock all our preparations were completed, and M. Fridriksson shook hands heartily with us. My uncle thanked him warmly, in the Icelandic language, for his kind hospitality, speaking truly from the heart.

As for myself I put together a few of my best Latin phrases and paid him the highest compliments I could. This fraternal and friendly duty performed, we sallied forth and mounted our horses.

As soon as we were quite ready, M. Fridriksson advanced, and by way of farewell, called after me in the words of Virgil—words which appeared to have been made for us, travellers starting for an uncertain destination:—

“Et quacunque viam dederit fortuna sequamur.”

(“And whichever way thou goest, may fortune follow!”)



EN ROUTE!

CHAPTER IX.

OUR START—WE MEET WITH ADVENTURES BY THE WAY.

THE weather was overcast but settled, when we commenced our adventurous and perilous journey. We had neither to fear fatiguing heat nor drenching rain. It was, in fact, real tourist weather.

As there was nothing I liked better than horse exercise, the pleasure of riding through an unknown country, caused the early part of our enterprise to be particularly agreeable to me.

I began to enjoy the exhilarating delight of travelling, a life of desire, gratification and liberty. The truth is, that my spirits rose so rapidly, that I began to be indifferent to what had once appeared to be a terrible journey.

“After all,” I said to myself, “what do I risk? Simply to take a journey through a curious country, to climb a remarkable mountain, and if the worst comes to the worst, to descend into the crater of an extinct volcano.”

There could be no doubt that this was all this terrible Saknussem had done. As to the existence of a gallery, or of subterraneous passages leading into the interior of the earth, the idea was simply absurd, the hallucination of a dis-tempered imagination. All, then, that may be required of me I will do cheerfully, and will create no difficulty.

It was just before we left Reykjawik that I came to this decision.

Hans, our extraordinary guide, went first, walking with a steady, rapid, and unvarying step. Our two horses with the luggage followed of their own accord, without requiring whip or spur. My uncle and I came behind, cutting a very tolerable figure upon our small but vigorous animals.

Iceland is one of the largest islands in Europe. It contains thirty thousand square miles of surface, and has about seventy thousand inhabitants. Geographers have divided it into four parts, and we had to cross the Southwest quarter which in the vernacular is called Sudvestr Fjördungr.

Hans, on taking his departure from Reykjavik, had followed the line of the sea. We took our way through poor and sparse meadows, which made a desperate effort every year to show a little green. They very rarely succeed in a good show of yellow.

The rugged summits of the rocky hills were dimly visible on the edge of the horizon, through the misty fogs; every now and then some heavy flakes of snow showed conspicuous in the morning light, while certain lofty and pointed rocks were first lost in the grey low clouds, their summits clearly visible above, like jagged reefs rising from a troublous sea.

Every now and then a spur of rock came down through the arid ground, leaving us scarcely room to pass. Our horses, however, appeared not only well acquainted with the country, but by a kind of instinct, knew which was the best road. My uncle had not even the satisfaction of urging forward his steed by whip, spur, or voice. It was utterly useless to show any signs of impatience. I could not help smiling to see him look so big on his little horse; his long legs now and then touching the ground made him look like a six-footed centaur.

“Good beast, good beast,” he would cry. “I assure you, Henry, that I begin to think no animal is more intelligent than an Icelandic horse. Snow, tempest, impracticable roads, rocks, icebergs—nothing stops him. He is brave; he is sober; he is safe; he never makes a false step; never glides or slips from his path. I dare to say that if any river, any fjord has to be crossed—and I have

no doubt there will be many—you will see him enter the water without hesitation like an amphibious animal, and reach the opposite side in safety. We must not, however, attempt to hurry him ; we must allow him to have his own way, and I will undertake to say that between us we shall do our ten leagues a day.”

“We may do so,” was my reply, “but what about our worthy guide?”

“I have not the slightest anxiety about him : those sort of people go ahead without knowing even what they are about. Look at Hans. He moves so little that it is impossible for him to become fatigued. Besides, if he were to complain of weariness, he could have the loan of my horse. I should have a violent attack of the cramp if I were not to have some sort of exercise. My arms are right—but my legs are getting a little stiff.”

All this while we were advancing at a rapid pace. The country we had reached was already nearly a desert. Here and there could be seen an isolated farm, some solitary boër, or Icelandic house, built of wood, earth, fragments of lava—looking like beggars on the highway of life. These wretched and miserable huts excited in us such pity that we felt half disposed to leave alms at every door. In this country there are no roads, paths are nearly unknown, and vegetation, poor as it was, slowly as it reached perfection, soon obliterated all traces of the few travellers who passed from place to place.

Nevertheless, this division of the province, situated only a few miles from the capital, is considered one of the best cultivated and most thickly peopled in all Iceland. What, then, must be the state of the less known and more distant parts of the island? After travelling fully half a Danish mile, we had met neither a farmer at the door of his hut, nor even a wandering shepherd with his wild and savage flock.

A few stray cows and sheep were only seen occasionally. What, then, must we expect when we come to the upheaved regions—to the districts broken and roughened from volcanic eruptions and subterraneous commotions?

We were to learn this all in good time. I saw, however, on consulting the map, that we avoided a good deal of this rough country, by following the winding and desolate shores of the sea. In reality, the great volcanic movement of the island, and all its attendant phenomena, is concentrated in the interior of the island; there, horizontal layers or strata of rocks, piled one upon the other, eruptions of basaltic origin, and streams of lava, have given this country a kind of supernatural reputation.

Little did I expect, however, the spectacle which awaited us when we reached the peninsula of Sneffels, where agglomerations of nature's ruins form a kind of terrible chaos.

Some two hours or more after we had left the city of Reykjavik, we reached the little town called Aoalkirkja, or the principal church. It consists simply of a few houses—not what in England or Germany we should call a hamlet.

Hans stopped here one half hour. He shared our frugal breakfast, answered *yes* and *no* to my uncle's questions as to the nature of the road, and at last when asked where we were to pass the night was as laconic as usual.

"Gardar!" was his one-worded reply.

I took occasion to consult the map, to see where Gardar was to be found. After looking keenly I found a small town of that name on the borders of the Hvalfjord, about four miles from Reykjavik. I pointed this out to my uncle, who made a very energetic grimace.

"Only four miles out of twenty-two? Why it is only a little walk."

He was about to make some energetic observation to the

guide, but Hans, without taking the slightest notice of him, went in front of the horses, and walked ahead with the same imperturbable phlegm he had always exhibited.

Three hours later, still travelling over those apparently interminable and sandy prairies, we were compelled to go round the Kollafjord, an easier and shorter cut than crossing the gulfs. Shortly after we entered a place of communal jurisdiction called Ejulberg, and the clock of which would then have struck twelve, if any Icelandic church had been rich enough to possess so valuable and useful an article. These sacred edifices are, however, very much like these people, who do without watches—and never miss them.

Here the horses were allowed to take some rest and refreshment, then following a narrow strip of shore between high rocks and the sea, they took us without further halt to the “*aoalkirkja*” of Brantar, and after another mile to “*Saurboer Annexia*,” a chapel of ease, situated on the southern bank of the Hvalfjord.

It was four o’clock in the evening and we had travelled four Danish miles, about equal to twenty English.

The fjord was in this place about half-a-mile in width. The sweeping and broken waves came rolling in upon the pointed rocks; the gulf was surrounded by rocky walls—a mighty cliff, three thousand feet in height, remarkable for its brown strata, separated here and there by beds of tufa of a reddish hue. Now, whatever may have been the intelligence of our horses, I had not the slightest reliance upon them, as a means of crossing a stormy arm of the sea. To ride over salt water upon the back of a little horse seemed to me absurd.

“If they are really intelligent,” I said to myself, “they will certainly not make the attempt. In any case, I shall trust rather to my own intelligence than theirs.”

But my uncle was in no humor to wait. He dug his

heels into the sides of his steed, and made for the shore. His horse went to the very edge of the water, sniffed at the approaching wave and retreated.

My uncle, who was, sooth to say, quite as obstinate as the beast he bestrode, insisted on his making the desired advance. This attempt was followed by a new refusal on the part of the horse which quietly shook his head. This demonstration of rebellion was followed by a volley of words and a stout application of whipcord; also followed by kicks on the part of the horse, which threw its head and heels upwards and tried to throw his rider. At length the sturdy little pony, spreading out his legs, in a stiff and ludicrous attitude, got from under the professor's legs, and left him standing, with both feet on a separate stone, like the Colossus of Rhodes.

"Wretched animal!" cried my uncle, suddenly transformed into a foot passenger—and as angry and ashamed as a dismounted cavalry officer on the field of battle.

"Farja," said the guide, tapping him familiarly on the shoulder.

"What, a ferry boat!"

"*Der*," answered Hans, pointing to where lay the boat in question—"there."

"Well," I cried, quite delighted with the information; "so it is."

"Why did you not say so before," cried my uncle; "why not start at once?"

"*Tidvatten*," said the guide.

"What does he say?" I asked, considerably puzzled by the delay and the dialogue.

"He says tide," replied my uncle, translating the Danish word for my information.

"Of course I understand—we must wait till the tide serves."

"*For bida?*" asked my uncle.

"*Ja*," replied Hans.

My uncle frowned, stamped his feet and then followed the horses to where the boat lay.

I thoroughly understood and appreciated the necessity for waiting, before crossing the fjord, for that moment when the sea at its highest point is in a state of slack water. As neither the ebb nor flow can then be felt, the ferry boat was in no danger of being carried out to sea, or dashed upon the rocky coast.

The favorable moment did not come until six o'clock in the evening. Then my uncle, myself, and guide, two boatmen and the four horses got into a very awkward flat-bottom boat. Accustomed as I had been to the steam ferry-boats of the Elbe, I found the long oars of the boatmen but sorry means of locomotion. We were more than an hour in crossing the fjord; but at length the passage was concluded without accident.

Half-an-hour later we reached Gardar.

CHAPTER X.

TRAVELLING IN ICELAND—THE LEPERS.

It ought, one would have thought, to have been night, even in the sixty-fifth parallel of latitude; but still the nocturnal illumination did not surprise me. For in Iceland, during the months of June and July, the sun never sets.

The temperature, however, was very much lower than I expected. I was cold, but even that did not affect me so much as ravenous hunger. Welcome indeed, therefore, was the hut which hospitably opened its doors to us.

It was merely the house of a peasant, but in the matter of hospitality, it was worthy of being the palace of a king. As we alighted at the door the master of the house came forward, held out his hand, and without any further ceremony, signaled to us to follow him.

We followed him, for to accompany him was impossible. A long, narrow, gloomy passage led into the interior of this habitation, made from beams roughly squared by the axe. This passage gave ingress to every room. The chambers were four in number—the kitchen, the work-shop, where the weaving was carried on, the general sleeping-chamber of the family, and the best room, to which strangers were especially invited. My uncle, whose lofty stature had not been taken into consideration when the house was built, contrived to knock his head against the beams of the roof.

We were introduced into our chamber, a kind of large room with a hard earthen floor, and lighted by a window, the panes of which were made of a sort of parchment from the intestines of sheep—very far from transparent.

The bedding was composed of dry hay thrown into two

long red wooden boxes, ornamented with sentences painted in Icelandic. I really had no idea that we should be made so comfortable. There was one objection to the house, and that was, the very powerful odor of dried fish, of macerated meat, and of sour milk, which three fragrances combined, did not at all suit my olfactory nerves.

As soon as we had freed ourselves from our heavy travelling costume, the voice of our host was heard calling to us to come into the kitchen, the only room in which the Icelanders ever make any fire, no matter how cold it may be.

My uncle, nothing loth, hastened to obey this hospitable and friendly invitation. I followed.

The kitchen chimney was made on an antique model. A large stone standing in the middle of the room was the fire-place, above, in the roof, was a hole for the smoke to pass through. This apartment was kitchen, parlor and dining-room all in one.

On our entrance, our worthy host, as if he had not seen us before, advanced ceremoniously, uttered a word which means "be happy," and then kissed both of us on the cheek.

His wife followed, pronounced the same word, with the same ceremonial, then the husband and wife, placing their right hands upon their hearts, bowed profoundly.

This excellent Icelandic woman was the mother of nineteen children, who, little and big, rolled, crawled, and walked about in the midst of volumes of smoke arising from the angular fire-place in the middle of the room. Every now and then I could see a fresh white head, and a slightly melancholy expression of countenance, peering at me through the vapor.

Both my uncle and myself, however, were very friendly with the whole party, and before we were aware of it, there were three or four of these little ones on our shoulders, as many on our boxes, and the rest hanging about our legs. Those who could speak kept crying out *sællvertu* in every

possible and impossible key. Those who did not speak only made all the more noise.

This concert was interrupted by the announcement of supper. At this moment our worthy guide, the eider-duck hunter, came in after seeing to the feeding and stabling of the horses—which consisted in letting them loose to browse on the stunted green of the Icelandic prairies. There was little for them to eat, but moss and some very dry and innutritious grass; next day they were ready before the door, some time before we were.

“Welcome,” said Hans.

Then tranquilly, with the air of an automaton, without any more expression in one kiss than another, he embraced the host and hostess and their nineteen children.

This ceremony concluded to the satisfaction of all parties, we all sat down to table, that is twenty-four of us, somewhat crowded. Those who were best off had only two juveniles on their knees.

As soon, however, as the inevitable soup was placed on the table, the natural taciturnity, common even to Icelandic babies, prevailed over all else. Our host filled our plates with a portion of *Lichen* soup of Iceland moss, of by no means disagreeable flavor, an enormous lump of fish floating in sour butter. After that there came some “skyr,” a kind of curds and whey, served with biscuits and juniper-berry juice. To drink, we had blanda, skimmed milk with water. I was hungry, so hungry, that by way of dessert I finished up with a basin of thick oaten porridge.

As soon as the meal was over, the children disappeared, whilst the grown people sat around the fire-place, on which was placed turf, heather, cow dung and dried fish-bones. As soon as everybody was sufficiently warm, a general dispersion took place, all retiring to their respective couches. Our hostess offered to pull off our stockings and trousers, according to the custom of the country, but as we

graciously declined to be so honored, she left us to our bed of dry fodder.

Next day, at five in the morning, we took our leave of these hospitable peasants. My uncle had great difficulty in making them accept a sufficient and proper remuneration.

Hans then gave the signal to start.

We had scarcely got a hundred yards from Gardar, when the character of the country changed. The soil began to be marshy and boggy, and less favorable to progress. To the right, the range of mountains was prolonged indefinitely like a great system of natural fortifications, of which we skirted the glacis. We met with numerous streams and rivulets which it was necessary to ford, and that without wetting our baggage. As we advanced, the deserted appearance increased, and yet now and then we could see human shadows flitting in the distance. When a sudden turn of the track brought us within easy reach of one of these spectres, I felt a sudden impulse of disgust at the sight of a swollen head, with shining skin, utterly without hair, and whose repulsive and revolting wounds could be seen through his rags. The unhappy wretches never came forward to beg; on the contrary, they ran away; not so quick, however, but that Hans was able to salute them with the universal *Sællvertu*.

"*Spetelsk*," said he.

"A leper," explained my uncle.

The very sound of such a word caused a feeling of repulsion. The horrible affection known as leprosy, which has almost vanished before the effects of modern science, is common in Iceland. It is not contagious but hereditary, so that marriage is strictly prohibited to these unfortunate creatures.

These poor lepers did not tend to enliven our journey, the scene of which was inexpressibly sad and lonely. The

very last tufts of grassy vegetation appeared to die at our feet. Not a tree was to be seen, except a few stunted willows about as big as blackberry bushes. Now and then we watched a falcon soaring in the grey and misty air, taking his flight towards warmer and sunnier regions. I could not help feeling a sense of melancholy come over me. I sighed for my own Native Land, and wished to be back with Gretchen.

We were compelled to cross several little fjords, and at last came to a real gulf. The tide was at its height, and we were able to go over at once, and reach the hamlet of Alftanes, about a mile farther.

That evening, after fording the Alfa and the Heta, two rivers rich in trout and pike, we were compelled to pass the night in a deserted house, worthy of being haunted by all the fays of Scandinavian mythology. The King of Cold had taken up his residence there, and made us feel his presence all night.

The following day was remarkable by its lack of any particular incidents. Always the same damp and swampy soil; the same dreary uniformity; the same sad and monotonous aspect of scenery. In the evening, having accomplished the half of our projected journey, we slept at the Annexia of Krosolbt.

For a whole mile we had under our feet nothing but lava. This disposition of the soil is called *hraun*: the crumbled lava on the surface was in some instances like ship cables stretched out horizontally, in others coiled up in heaps; an immense field of lava came from the neighboring mountains, all extinct volcanoes, but whose remains showed what once they had been. Here and there could be made out the steam from hot water springs.

There was no time, however, for us to take more than a cursory view of these phenomena. We had to go forward with what speed we might. Soon the soft and swampy soil

again appeared under the feet of our horses, while at every hundred yards we came upon one or more small lakes. Our journey was now in a westernly direction; we had, in fact, swept round the great bay of Faxe, and the twin white summits of Sneffels rose to the clouds at a distance of less than five miles.

The horses now advanced rapidly. The accidents and difficulties of the soil no longer checked them. I confess that fatigue began to tell severely upon me; but my uncle was as firm and as hard as he had been on the first day. I could not help admiring both the excellent Professor and the worthy guide; for they appeared to regard this rugged expedition as a mere walk!

On Saturday, the 20th June, at six o'clock in the evening, we reached Budir, a small town picturesquely situated on the shore of the ocean; and here the guide asked for his money. My uncle settled with him immediately. It was now the family of Hans himself, that is to say, his uncles, his cousins-german, who offered us hospitality. We were exceedingly well received, and without taking too much advantage of the goodness of these worthy people, I should have liked very much to have rested with them after the fatigues of the journey. But my uncle, who did not require rest, had no idea of anything of the kind; and despite the fact that next day was Sunday, I was compelled once more to mount my steed.

The soil was again affected by the neighborhood of the mountains, whose granite peered out of the ground like tops of an old oak. We were skirting the enormous base of the mighty volcano. My uncle never took his eyes from off it; he could not keep from gesticulating, and looking at it with a kind of sullen defiance as much as to say "That is the giant I have made up my mind to conquer."

After four hours of steady travelling, the horses stopped of themselves before the door of the presbytery of Stapi.

CHAPTER XI.

WE REACH MOUNT SNEFFELS.—THE “REYKIR.”

STAPI is a town consisting of thirty huts, built on a large plain of lava, exposed to the rays of the sun, reflected from the volcano. It stretches its humble tenements along the end of a little fjord, surrounded by a basaltic wall of the most singular character.

Basalt is a brown rock of igneous origin. It assumes regular forms, which astonish by their singular appearance. Here we found Nature proceeding geometrically, and working quite after a human fashion, as if she had employed the plummet line, the compass and the rule. If elsewhere she produces grand artistic effects by piling up huge masses without order or connection—if elsewhere we see truncated cones, imperfect pyramids, with an odd succession of lines; here, as if wishing to give a lesson in regularity, and preceding the architects of the early ages, she has erected a severe order of architecture, which neither the splendors of Babylon nor the marvels of Greece ever surpassed.

I had often heard of the ‘Giants’ Causeway in Ireland, the Grotto of Fingal in one of the Hebrides, but the grand spectacle of a real basaltic formation had never yet come before my eyes.

This at Stapi gave us an idea of one in all its wonderful beauty and grace.

The wall of the fjord, like nearly the whole of the peninsula, consisted of a series of vertical columns, in height about thirty feet. These upright pillars of stone, of the finest proportions, supported an archivault of horizontal

columns which formed a kind of half-vaulted roof above the sea. At certain intervals, and below this natural basin, the eye was pleased and surprised by the sight of oval openings through which the outward waves came thundering in volleys of foam. Some banks of basalt, torn from their fastenings by the fury of the waves, lay scattered on the ground like the ruins of an ancient temple—ruins eternally young, over which the storms of ages swept without producing any perceptible effect!

This was the last stage of our journey. Hans had brought us along with fidelity and intelligence, and I began to feel somewhat more comfortable when I reflected that he was to accompany us still farther on our way.

When we halted before the house of the Rector, a small and incommensurable cabin, neither handsome nor more comfortable than those of his neighbors, I saw a man in the act of shoeing a horse, a hammer in his hand, and a leathern apron tied round his waist.

“Be happy,” said the eider-down hunter, using his national salutation in his own language.

“*Good-dag*—good day!” replied the former, in excellent Danish.

“Kyrkoherde,” cried Hans, turning round and introducing him to my uncle.

“The Rector,” repeated the worthy Professor; “it appears, my dear Harry, that this worthy man is the Rector, and is not above doing his own work.”

During the speaking of these few words the guide intimated to the Kyrkoherde what was the true state of the case. The good man, ceasing from his occupation, gave a kind of halloo, upon which a tall woman, almost a giantess, came out of the hut. She was at least six feet high, which in that region is something considerable.

My first impression was one of horror. I thought she had come to give us the Icelandic kiss. I had, however,

nothing to fear, for she did not even show much inclination to receive us into her house.

The room devoted to strangers appeared to me to be by far the worst in the presbytery ; it was narrow, dirty and offensive. There was, however, no choice about the matter. The Rector had no notion of practising the usual cordial and antique hospitality. Far from it. Before the day was over, I found we had to deal with a blacksmith, a fisherman, a hunter, a carpenter, anything but a clergyman. It must be said in his favor that we had caught him on a week-day ; probably he appeared to greater advantage on the Sunday.

These poor priests receive from the Danish Government a most ridiculously inadequate salary, and collect one quarter of the tithe of their parish—not more than sixty marks current, or about £3 10s. sterling. Hence the necessity of working to live. In truth, we soon found that our host did not count civility among the cardinal virtues.

My uncle soon became aware of the kind of man he had to deal with. Instead of a worthy and learned scholar, he found a dull ill-mannered peasant. He therefore resolved to start on his great expedition as soon as possible. He did not care about fatigue, and resolved to spend a few days in the mountains.

The preparations for our departure were made the very next day after our arrival at Stapi ; Hans now hired three Icelanders to take the place of the horses—which could no longer carry our luggage. When, however, these worthy islanders had reached the bottom of the crater, they were to go back and leave us to ourselves. This point was settled before they would agree to start.

On this occasion, my uncle partially confided in Hans, the eider-duck hunter, and gave him to understand that it was his intention to continue his exploration of the volcano to the last possible limits.

Hans listened calmly, and then nodded his head. To go there, or elsewhere, to bury himself in the bowels of the earth, or to travel over its summits, was all the same to him! As for me, amused and occupied by the incidents of travel, I had begun to forget the inevitable future; but now I was once more destined to realize the actual state of affairs. What was to be done? Run away? But if I really had intended to leave Professor Hardwigg to his fate, it should have been at Hamburg and not at the foot of Sneffels.

One idea above all others, began to trouble me: a very terrible idea, and one calculated to shake the nerves of a man even less sensitive than myself.

"Let us consider the matter," I said to myself; "we are going to ascend the Sneffels mountain. Well and good. We are about to pay a visit to the very bottom of the crater. Good, still. Others have done it and did not perish from that course.

"That, however, is not the whole matter to be considered. If a road does really present itself by which to descend into the dark and subterraneous bowels of Mother Earth, if this thrice unhappy Saknussemm has really told the truth, we shall be most certainly lost in the midst of the labyrinth of subterraneous galleries of the volcano. Now, we have no evidence to prove that Sneffels is really extinct. What proof have we that an eruption is not shortly about to take place? Because the monster has slept soundly since 1229, does it follow that he is never to wake?"

"If he does wake what is to become of us?"

These were questions worth thinking about, and upon them I reflected long and deeply. I could not lie down in search of sleep without dreaming of eruptions. The more I thought, the more I objected to be reduced to the state of dross and ashes.

I could stand it no longer; so I determined at last to submit the whole case to my uncle, in the most adroit manner possible, and under the form of some totally irreconcilable hypothesis.

I sought him. I laid before him my fears, and then drew back in order to let him get his passion over at his ease.

"I have been thinking about the matter," he said, in the quietest tone in the world.

What did he mean? Was he at last about to listen to the voice of reason? Did he think of suspending his projects? It was almost too much happiness to be true.

I however made no remark. In fact, I was only too anxious not to interrupt him, and allowed him to reflect at his leisure. After some moments he spoke out.

"I have been thinking about the matter," he resumed. "Ever since we have been at Stapi, my mind has been almost solely occupied with the grave question which has been submitted to me by yourself—for nothing would be unwise and more inconsistent than to act with imprudence."

"I heartily agree with you, my dear uncle," was my somewhat hopeful rejoinder.

"It is now six hundred years since Sneffels has spoken, but though now reduced to a state of utter silence, he may speak again. New volcanic eruptions are always preceded by perfectly well-known phenomena. I have closely examined the inhabitants of this region; I have carefully studied the soil, and I beg to tell you emphatically, my dear Harry, there will be no eruption at present."

As I listened to his positive affirmations, I was stupefied and could say nothing.

"I see you doubt my word," said my uncle; "follow me."

I obeyed mechanically.



THE ASCENT OF SNEFFELS.

Leaving the presbytery, the Professor took a road through an opening in the basaltic rock, which led far away from the sea. We were soon in open country, if we could give such a name to a place all covered with volcanic deposits. The whole land seemed crushed under the weight of enormous stones—of trap, of basalt, of granite, of lava, and of all other volcanic substances.

I could see many spouts of steam rising in the air. These white vapors, called in the Icelandic language “reykir,” come from hot water fountains, and indicate by their violence the volcanic activity of the soil. Now the sight of these appeared to justify my apprehension. I was, therefore, all the more surprised and mortified when my uncle thus addressed me.

“You see all this smoke, Harry, my boy?”

“Yes, sir.”

“Well, as long as you see them thus, you have nothing to fear from the volcano.”

“How can that be?”

“Be careful to remember this,” continued the Professor. “At the approach of an eruption these spouts of vapor redouble their activity—to disappear altogether during the period of volcanic eruption; for the elastic fluids, no longer having the necessary tension, seek refuge in the interior of the crater, instead of escaping through the fissures of the earth. If, then, the steam remains in its normal or habitual state, if their energy does not increase, and if you add to this, the remark, that the wind is not replaced by heavy atmospheric pressure and dead calm, you may be quite sure that there is no fear of any immediate eruption.”

“But——”

“Enough, my boy. When science has sent forth her fiat—it is only to hear and obey.”

I came back to the house quite downcast and disappointed. My uncle had completely defeated me with his

scientific arguments. Nevertheless, I had still one hope, and that was, when once we were at the bottom of the crater, that it would be impossible in default of a gallery or tunnel, to descend any deeper; and this, despite all the learned Saknussemms in the world.

I passed the whole of the following night with a nightmare on my chest! and, after unheard-of miseries and tortures, found myself in the very depths of the earth, from which I was suddenly launched into planetary space, under the form of an eruptive rock!

Next day, the 23d June, Hans calmly awaited us outside the presbytery with his two companions loaded with provisions, tools, and instruments. Two iron-shod poles, two guns, and two large game bags, were reserved for my uncle and myself. Hans, who was a man who never forgot even the minutest precautions, had added to our baggage a large skin full of water, as an addition to our gourds. This assured us water for eight days.

It was nine o'clock in the morning when we were quite ready. The rector and his huge wife or servant, I never knew which, stood at the door to see us off. They appeared to be about to inflict on us the usual final kiss of the Icelanders. To our supreme astonishment their adieu took the shape of a formidable bill, in which they even counted the use of the pastoral house, really and truly the most abominable and dirty place I ever was in. The worthy couple cheated and robbed us like a Swiss innkeeper, and made us feel, by the sum we had to pay, the splendors of their hospitality.

My uncle, however, paid without bargaining. A man who had made up his mind to undertake a voyage into the Interior of the Earth, is not the man to haggle over a few miserable rix-dollars.

This important matter settled, Hans gave the signal for departure, and some few moments later we had left Stapi.

CHAPTER XII.

THE ASCENT OF MOUNT SNEFFELS.

THE huge volcano which was the first stage of our first experiment, is above five thousand feet high. Sneffels is the termination of a long range of volcanic mountains, of a different character to the system of the island itself. One of its peculiarities is its two huge pointed summits. From whence we started it was impossible to make out the real outlines of the peak against the grey field of sky. All we could distinguish was a vast dome of white, which fell downwards from the head of the giant.

The commencement of the great undertaking filled me with awe. Now that we had actually started, I began to believe in the reality of the undertaking!

Our party formed quite a procession. We walked in single file, preceded by Hans, the imperturbable eider-duck hunter. He calmly led us by narrow paths where two persons could by no possibility walk abreast. Conversation was wholly impossible. We had all the more opportunity to reflect and admire the awful grandeur of the scene around.

Beyond the extraordinary basaltic wall of the fjord of Stapi we found ourselves making our way through fibrous turf, over which grew a scanty vegetation of grass, the residuum of the ancient vegetation of the swampy peninsula. The vast mass of this combustible, the field of which as yet is utterly unexplored, would suffice to warm Iceland for a whole century. This mighty turf pit, measured from the bottom of certain ravines, is often not less than seventy feet deep, and presents to the eye the view

of successive layers of black burned^d rocky detritus, separated by thin streaks of porous sand^{ne}.

The grandeur of the spectacle was undoubted, as well as its arid and deserted air.

As a true nephew of the great Professor Håwigg, and despite my pre-occupation and doleful fears of what was to come, I observed with great interest the vast collection of mineralogical curiosities spread out before me in this vast museum of natural history. Looking back to my recent studies, I went over in thought the whole geological history of Iceland.

This extraordinary and curious island must have made its appearance from out of the great world of waters at a comparatively recent date. Like the coral islands of the Pacific, it may, for aught we know, be still rising by slow and imperceptible degrees.

If this really be the case, its origin can be attributed to only one cause—that of the continued action of subterranean fires.

This was a happy thought.

If so, if this were true, away with the theories of Sir Humphrey Davy; away with the authority of the arch-enemy of Arne Saknussemm; the wonderful pretensions to discovery on the part of my uncle—and to our journey!

All must end in smoke.

Charmed with the idea, I began more carefully to look about me. A serious study of the soil was necessary to negative or confirm my hypothesis. I took in everything of what I saw, and I began to comprehend the succession of phenomena which had preceded its formation.

Iceland, being absolutely without sedimentary soil, is composed exclusively of volcanic tuffa; that is to say of an agglomeration of stones and of rocks of a porous texture. Long before the existence of volcanoes, it was composed of a solid body of massive trap-rock lifted bodily and

slowly out of the sea, by the action of the centrifugal force at work in the earth.

The internal fires, however, had not as yet burst their bounds and flooded the exterior cake of Mother Earth with hot and raging lava.

My readers must excuse this brief and somewhat pedantic geological lecture. But it is necessary to the complete understanding of what follows.

At a later period in the world's history, a huge and mighty fissure must, reasoning by analogy, have been dug diagonally from the south-west to the north-east of the island, through which by degrees flowed the volcanic crust. The great and wondrous phenomenon then went on without violence—the outpouring was enormous, and the seething fused matter, ejected from the bowels of the earth, spread slowly and peacefully in the form of vast level plains, or what are called *mamelons* or mounds.

It was at this epoch that the rocks called *feldspars*, *syenites*, and *porphyries* appeared.

But as a natural consequence of this overflow, the depth of the island increased. It can readily be believed what an enormous quantity of elastic fluids were piled up within its centre, when at last it afforded no other openings, after the process of cooling the crust had taken place.

At length a time came when despite the enormous thickness and weight of the upper crust, the mechanical forces of the combustible gases below became so great, that they actually upheaved the weighty back and made for themselves huge and gigantic shafts. Hence the volcanoes which suddenly arose through the upper crust, and next the craters, which burst forth at the summit of these new creations.

It will be seen that the first phenomena in connection with the formation of the island were simply eruptive; to these, however, shortly succeeded the volcanic phenomena.

Through the newly-formed openings, escaped the marvellous mass of basaltic stones with which the plain we were now crossing was covered. We were trampling our way over heavy rocks of dark grey color, which, while cooling, had been moulded into six-sided prisms. In the "back distance" we could see a number of flattened cones, which formerly were so many fire-vomiting mouths.

After the basaltic eruption was appeased and set at rest, the volcano, the force of which increased with that of the extinct craters, gave free passage to the fiery overflow of lava, and to the mass of cinders and pumice-stone, now scattered over the sides of the mountain, like dishevelled hair on the shoulders of a Bacchante:

Here, in a nutshell, I had the whole history of the phenomena from which Iceland arose. All take their rise in the fierce action of interior fires, and to believe that the central mass did not remain in a state of liquid fire, white hot, was simply and purely madness.

This being satisfactorily proved, (*q. e. d.*) what insensate folly to pretend to penetrate into the interior of the mighty earth!

This mental lecture delivered to myself while proceeding on a journey, did me good. I was quite re-assured as to the fate of our enterprise; and therefore went, like a brave soldier mounting a bristling battery, to the assault of old Sneffels.

As we advanced, the road became every moment more difficult. The soil was broken and dangerous. The rocks broke and gave way under our feet, and we had to be scrupulously careful in order to avoid dangerous and constant falls.

Hans advanced as calmly as if he had been walking over Salisbury Plain; sometimes he would disappear behind huge blocks of stone, and we momentarily lost sight of him. There was a little period of anxiety and then

there was a shrill whistle, just to tell us where to look for him.

Occasionally he would take it into his head to stop to pick up lumps of rock, and silently pile them up into small heaps, *in order that we might not lose our way on our return.*

He had no idea of the journey we were about to undertake.

At all events, the precaution was a good one; though how utterly useless and unnecessary—but I must not anticipate.

Three hours of terrible fatigue, walking incessantly, had only brought us to the foot of the great mountain. This will give some notion of what we had still to undergo.

Suddenly, however, Hans cried a halt—that is, he made signs to that effect—and a summary kind of breakfast was laid out on the lava before us. My uncle, who now was simply Professor Hardwigg, was so eager to advance, that he bolted his food like a greedy clown. This halt for refreshment was also a halt for repose. The Professor was therefore compelled to wait the good pleasure of his imperturbable guide, who did not give the signal for departure for a good hour.

The three Icelanders, who were as taciturn as their comrade, did not say a word; but went on eating and drinking very quietly and soberly.

From this, our first real stage, we began to ascend the slopes of the Sneffels volcano. Its magnificent snowy night-cap, as we began to call it, by an optical delusion very common in mountains, appeared to me to be close at hand; and yet how many long weary hours must elapse before we reached its summit. What unheard-of fatigue must we endure!

The stones on the mountain side, held together by no cement of soil, bound together by no roots or creeping

herbs, gave way continually under our feet, and went rushing below into the plains, like a series of small avalanches.

In certain places the sides of this stupendous mountain were at an angle so steep that it was impossible to climb upwards, and we were compelled to get round these obstacles as best we might.

Those who understand Alpine climbing will comprehend our difficulties. Often we were obliged to help each other along by means of our climbing poles.

I must say this for my uncle, that he stuck as close to me as possible. He never lost sight of me, and on many occasions his arm supplied me with firm and solid support. He was strong, wiry, and apparently insensible to fatigue. Another great advantage with him was that he had the innate sentiment of equilibrium—for he never slipped or failed in his steps. The Icelanders, though heavily loaded, climbed with the agility of mountaineers.

Looking up, every now and then, at the height of the great volcano of Sneffels, it appeared to me wholly impossible to reach to the summit on that side; at all events, if the angle of inclination did not speedily change.

Fortunately, after an hour of unheard-of fatigues, and of gymnastic exercises that would have been trying to an acrobat, we came to a vast field of ice, which wholly surrounded the bottom of the cone of the volcano. The natives called it the table-cloth, probably from some such reason as the dwellers in the Cape of Good Hope call their mountain Table Mountain, and their roads Table Bay.

Here, to our mutual surprise, we found an actual flight of stone steps, which wonderfully assisted our ascent. This singular flight of stairs was, like everything else, volcanic. It had been formed by one of those torrents of stones cast up by the eruptions, and of which the Ice-

landic name is *stinâ*. If this singular torrent had not been checked in its descent by the peculiar shape of the flanks of the mountain, it would have swept into the sea, and would have formed new islands.

Such as it was, it served us admirably. The abrupt character of the slopes momentarily increased, but these remarkable stone steps, a little less difficult than those of the Egyptian pyramids, were the one simple natural means by which we were enabled to proceed.

About seven in the evening of that day, after having clambered up two thousand of these rough steps, we found ourselves overlooking a kind of spur or projection of the mountain—a sort of buttress upon which the cone-like crater, properly so called, leaned for support.

The ocean lay beneath us at a depth of more than three thousand two hundred feet—a grand and mighty spectacle. We had reached the region of eternal snows.

The cold was keen, searching and intense. The wind blew with extraordinary violence. I was utterly exhausted.

My worthy uncle, the Professor, saw clearly that my legs refused further service, and that, in fact, I was utterly exhausted. Despite his hot and feverish impatience, he decided, with a sigh, upon a halt. He called the eider-duck hunter to his side. That worthy, however, shook his head.

“Ofvanfor,” was his sole spoken reply.

“It appears,” says my uncle with a woe-begone look, “that we must go higher.”

He then turned to Hans, and asked him to give some reason for this decisive response.

“Mistour,” replied the guide.

“*Ja mistour*—yes, the mistour,” cried one of the Icelandic guides in a terrified tone.

It was the first time he had spoken.

"What does this mysterious word signify?" I anxiously inquired.

"Look," said my uncle.

I looked down upon the plain below, and I saw a vast, a prodigious volume of pulverized pumice-stone, of sand, of dust, rising to the heavens in the form of a mighty water-spout. It resembled the fearful phenomenon of a similar character known to the travellers in the desert of the great Sahara.

The wind was driving it directly towards that side of Sneffels on which we were perched. This opaque veil standing up between us and the sun projected a deep shadow on the flanks of the mountain. If this sand-spout broke over us, we must all be infallibly destroyed, crushed in its fearful embraces. This extraordinary phenomenon, very common when the wind shakes the glaciers, and sweeps over the arid plains, is in the Icelandic tongue called *mistour*.

"Hastigt, Hastigt!" cried our guide.

Now I certainly knew nothing of Danish, but I thoroughly understood that his gestures were meant to quicken us.

The guide turned rapidly in a direction which would take us to the back of the crater, all the while ascending slightly.

We followed rapidly, despite our excessive fatigue.

A quarter of an hour later Hans paused to enable us to look back. The mighty whirlwind of sand was spreading up the slope of the mountain to the very spot where we had proposed to halt. Huge stones were caught up, cast into the air, and thrown about as during an eruption. We were happily a little out of the direction of the wind, and therefore out of reach of danger. But for the precaution and knowledge of our guide, our dislocated bodies, our crushed and broken limbs, would have been cast to the wind, like dust from some unknown meteor.

Hans, however, did not think it prudent to pass the night on the bare side of the cone. We therefore continued our journey in a zigzag direction. The fifteen hundred feet which remained to be accomplished took us at least five hours. The turnings and windings, the no-thoroughfares, the marches and marches, turned that insignificant distance into at least three leagues. I never felt such misery, fatigue and exhaustion in my life. I was ready to faint from hunger and cold. The rarified air at the same time painfully acted upon my lungs.

At last, when I thought myself at my last gasp, about eleven at night, it being in that region quite dark, we reached the summit of Mount Sneffels! it was in an awful mood of mind, that despite my fatigue, before I descended into the crater which was to shelter us for the night, I paused to behold the sun rise at midnight on the very day of its lowest declension, and enjoyed the spectacle of its ghastly pale rays cast upon the isle which lay sleeping at our feet!

I no longer wondered at people travelling all the way from England to Norway, to behold this magical and wondrous spectacle.

CHAPTER XIII.

THE SHADOW OF SCARTARIS.

OUR supper was eaten with ease and rapidity, after which everybody did the best he could for himself within the hollow of the crater. The bed was hard, the shelter unsatisfactory, the situation painful—lying in the open air, five thousand feet above the level of the sea!

Nevertheless, it has seldom happened to me to sleep so well as I did on that particular night. I did not even dream. So much for the effects of what my uncle called “wholesome fatigue.”

Next day, when we awoke under the rays of a bright and glorious sun, we were nearly frozen by the keen air. I left my granite couch and made one of the party to enjoy a view of the magnificent spectacle which developed itself, panorama-like, at our feet.

I stood upon the lofty summit of Mount Sneffels' southern peak. Thence I was able to obtain a view of the greater part of the island. The optical delusion, common to all lofty heights, raised the shores of the island, while the central portions appeared depressed. It was by no means too great a flight of fancy to believe that a giant picture was stretched out before me. I could see the deep valleys that crossed each other in every direction. I could see precipices looking like sides of wells, lakes that seemed to be changed into ponds, ponds that looked like puddles, and rivers that were transformed into petty brooks. To my right were glaciers upon glaciers, and multiplied peaks, topped with light clouds of smoke.

The undulation of these infinite numbers of mountains,

whose snowy summits make them look as if covered by foam, recalled to my remembrance the surface of a storm-beaten ocean. If I looked towards the west, the ocean lay before me in all its majestic grandeur, a continuation as it were, of these fleecy hill-tops.

Where the earth ended and the sea began it was impossible for the eye to distinguish.

I soon felt that strange and mysterious sensation which is awakened in the mind when looking down from lofty hill tops, and now I was able to do so without any feeling of nervousness, having fortunately hardened myself to that kind of sublime contemplation.

I wholly forgot who I was, and where I was. I became intoxicated with a sense of lofty sublimity, without thought of the abysses into which my daring was soon about to plunge me. I was presently, however, brought back to the realities of life, by the arrival of the Professor and Hans, who joined me upon the lofty summit of the peak.

My uncle, turning in a westerly direction, pointed out to me a light cloud of vapor, a kind of haze, with a faint outline of land rising out of the waters.

"Greenland!" said he.

"Greenland?" cried I in reply.

"Yes," continued my uncle, who always when explaining anything spoke as if he were in a Professor's chair; "we are not more than thirty-five leagues distant from that wonderful land. When the great annual break up of the ice takes place, white bears come over to Iceland, carried by the floating masses of ice from the north. This, however, is a matter of little consequence. We are now on the summit of the great, the transcendent Sneffels, and here are its two peaks, north and south. Hans will tell you the name by which the people of Iceland call that on which we stand."

My uncle turned to the imperturbable guide, who nodded, and spoke as usual—one word.

“*Scartaris.*”

My uncle looked at me with a proud and triumphant glance.

“A crater,” he said, “you hear?”

I did hear, but I was totally unable to make reply.

The crater of Mount Sneffels represented an inverted cone, the gaping orifice apparently half a mile across; the depth indefinite feet. Conceive what this *hole* must have been like when full of flame and thunder and lightning. The bottom of the funnel-shaped hollow was about five hundred feet in circumference, by which it will be seen that the slope from the summit to the bottom was very gradual, and we were therefore clearly able to get there without much fatigue or difficulty. Involuntarily, I compared this crater to an enormous loaded cannon; and the comparison completely terrified me.

“To descend into the interior of a cannon,” I thought to myself, “when perhaps it is loaded, and will go off at the least shock, is the act of a madman.”

But there was no longer any opportunity for me to hesitate. Hans, with a perfectly calm and indifferent air, took his usual post at the head of the adventurous little band. I followed without uttering a syllable.

I felt like the lamb led to the slaughter.

In order to render the descent less difficult, Hans took his way down the interior of the cone in rather a zigzag fashion, making, as the sailors say, long tracks to the eastward, followed by equally long ones to the west. It was necessary to walk through the midst of eruptive rocks, some of which, shaken in their balance, went rolling down with thundering clamor to the bottom of the abyss. These continual falls awoke echoes of singular power and effect.

Many portions of the cone consisted of inferior glaciers. Hans, whenever he met with one of these obstacles advanced with a great show of precaution, sounding the soil with his long iron pole in order to discover fissures and layers of deep soft snow. In many doubtful or dangerous places, it became necessary for us to be tied together by a long rope in order that should any one of us be unfortunate enough to slip, he would be supported by his companions. This connecting link was doubtless a prudent precaution, but not by any means unattended with danger.

Nevertheless, and despite all the manifold difficulties of the descent, along slopes with which our guide was wholly unacquainted, we made considerable progress without accident. One of our great parcels of rope slipped from one of the Iceland porters, and rushed by a short cut to the bottom of the abyss.

By mid-day we were at the end of our journey. I looked upwards, and saw only the upper orifice of the cone, which served as a circular frame to a very small portion of the sky—a portion which seemed to me singularly beautiful. Should I ever again gaze on that lovely sunlit sky!

The only exception to this extraordinary landscape, was the Peak of Scartaris, which seemed lost in the great void of the heavens.

The bottom of the crater was composed of three separate shafts, through which, during periods of eruption, when Sneffels was in action, the great central furnace sent forth its burning lava and poisonous vapors. Each of these chimneys or shafts gaped open-mouthed in our path. I kept as far away from them as possible, not even venturing to take the faintest peep downwards.

As for the Professor, after a rapid examination of their disposition and characteristics, he became breathless and panting. He ran from one to the other like a delighted

school-boy, gesticulating wildly, and uttering incomprehensible and disjointed phrases in all sorts of languages.

Hans, the guide, and his humbler companions seated themselves on some piles of lava and looked silently on. They clearly took my uncle for a lunatic; and—waited the result.

Suddenly the Professor uttered a wild, unearthly cry. At first I imagined he had lost his footing, and was falling headlong into one of the yawning gulfs. Nothing of the kind. I saw him, his arms spread out to their widest extent, his legs stretched apart, standing upright before an enormous pedestal, high enough and black enough to bear a gigantic statue of Pluto. His attitude and mien were that of a man utterly stupefied. But his stupefaction was speedily changed to the wildest joy.

“Harry! Harry! come here!” he cried; “make haste—wonderful—wonderful!”

Unable to understand what he meant, I turned to obey his commands. Neither Hans, nor the other Icelanders moved a step.

“Look!” said the Professor, in something of the manner of the French general, pointing out the pyramids to his army.

And fully partaking his stupefaction, if not his joy, I read on the eastern side of the huge block of stone, the same characters, half eaten away by the corrosive action of time, the name, to me a thousand times accursed—

1111 4111111111

“Arne Saknussem!” cried my uncle, “now, unbeliever, do you begin to have faith?”

It was totally impossible for me to answer a single word. I went back to my pile of lava, in a state of silent awe. The evidence was unanswerable, overwhelming!

In a few moments, however, my thoughts were far away, back in my German home, with Gretchen and the old cook. What would I have given for one of my cousin's smiles, for one of the ancient domestic's omelettes, and for my own feather bed!

How long I remained in this state I know not. All I can say is, that when at last I raised my head from between my hands, there remained at the bottom of the crater only myself, my uncle and Hans. The Icelandic porters had been dismissed and were now descending the exterior slopes of Mount Sneffels, on their way to Stapi. How heartily did I wish myself with them!

Hans slept tranquilly at the foot of a rock in a kind of rill of lava, where he had made himself a rough and ready bed. My uncle was walking about the bottom of the crater like a wild beast in a cage. I had no desire, neither had I the strength, to move from my recumbent position. Taking example by the guide, I gave way to a kind of painful somnolency, during which I seemed both to hear and feel continued heavings and shudderings in the mountain.

In this way we passed our first night in the interior of a crater.

Next morning, a grey, cloudy, heavy sky hung like a funeral-pall over the summit of the volcanic cone. I did not notice it so much from the obscurity that reigned around us, as from the rage with which my uncle was devoured.

I fully understood the reason, and again a glimpse of hope made my heart leap with joy. I will briefly explain the cause.

Of the three openings which yawned beneath our steps, only one could have been followed by the adventurous Saknussem. According to the words of the learned Icelanders, it was only to be known by that one particular

mentioned in the cryptograph, that the shadow of Scartaris fell upon it, just touching its mouth in the last days of the month of June.

We were, in fact, to consider the pointed peak as the *stylus* of an immense sun-dial, the shadow of which pointed on one given day, like the inexorable finger of fate, to the yawning chasm which led into the interior of the earth.

Now, as often happens in these regions, should the sun fail to burst through the clouds, no shadow. Consequently, no chance of discovering the right aperture. We had already reached the 25th June. If the kindly heavens would only remain densely clouded for six more days, we should have to put off our voyage of discovery for another year, when certainly there would be one person fewer in the party. I already had sufficient of the mad and monstrous enterprise.

It would be utterly impossible to depict the impotent rage of Professor Hardwigg. The day passed away, and not the faintest outline of a shadow could be seen at the bottom of the crater. Hans the guide never moved from his place. He must have been curious to know what we were about, if indeed he could believe we were about anything. As for my uncle, he never addressed a word to me. He was nursing his wrath to keep it warm! His eyes fixed on the black and foggy atmosphere, his complexion hideous with suppressed passion. Never had his eyes appeared so fierce, his nose so aquiline, his mouth so hard and firm.

On the 26th no change for the better. A mixture of rain and snow fell during the whole day. Hans very quietly built himself a hut of lava into which he retired like Diogenes into his tub. I took a malicious delight in watching the thousand little cascades that flowed down the side of the cone, carrying with them at times a stream of stones into the "vasty deep" below.

My uncle was almost frantic: to be sure it was enough to make even a patient man angry. He had reached to a certain extent the goal of his desires, and yet he was likely to be wrecked in port.

But if the heavens and the elements are capable of causing us much pain and sorrow, there are two sides to a medal. And there was reserved for Professor Hardwigg a brilliant and sudden surprise which was to compensate him for all his sufferings.

Next day the sky was still overcast, but on Sunday, the 26th, the last day but one of the month, with a sudden change of wind and a new moon there came a change of weather. The sun poured its beaming rays to the very bottom of the crater.

Each hillock, every rock, every stone, every asperity of the soil had its share of the luminous effulgence, and its shadow fell heavily on the soil. Among others, to his insane delight, the shadow of Scartaris was marked and clear, and moved slowly with the radiant star of day.

My uncle moved with it in a state of mental ecstasy.

At twelve o'clock exactly, when the sun had attained its highest altitude for the day, the shadow fell upon the edge of the central pit!

"Here it is," gasped the Professor in an agony of joy, "here it is—we have found it. Forward, my friends, into the Interior of the Earth."

I looked curiously at Hans to see what reply he would make to this terrific announcement.

"Forüt," said the guide tranquilly.

"Forward it is," answered my uncle, who was now in the seventh heaven of delight.

When we were quite ready, our watches indicated thirteen minutes past one!

CHAPTER XIV.

THE REAL JOURNEY COMMENCES.

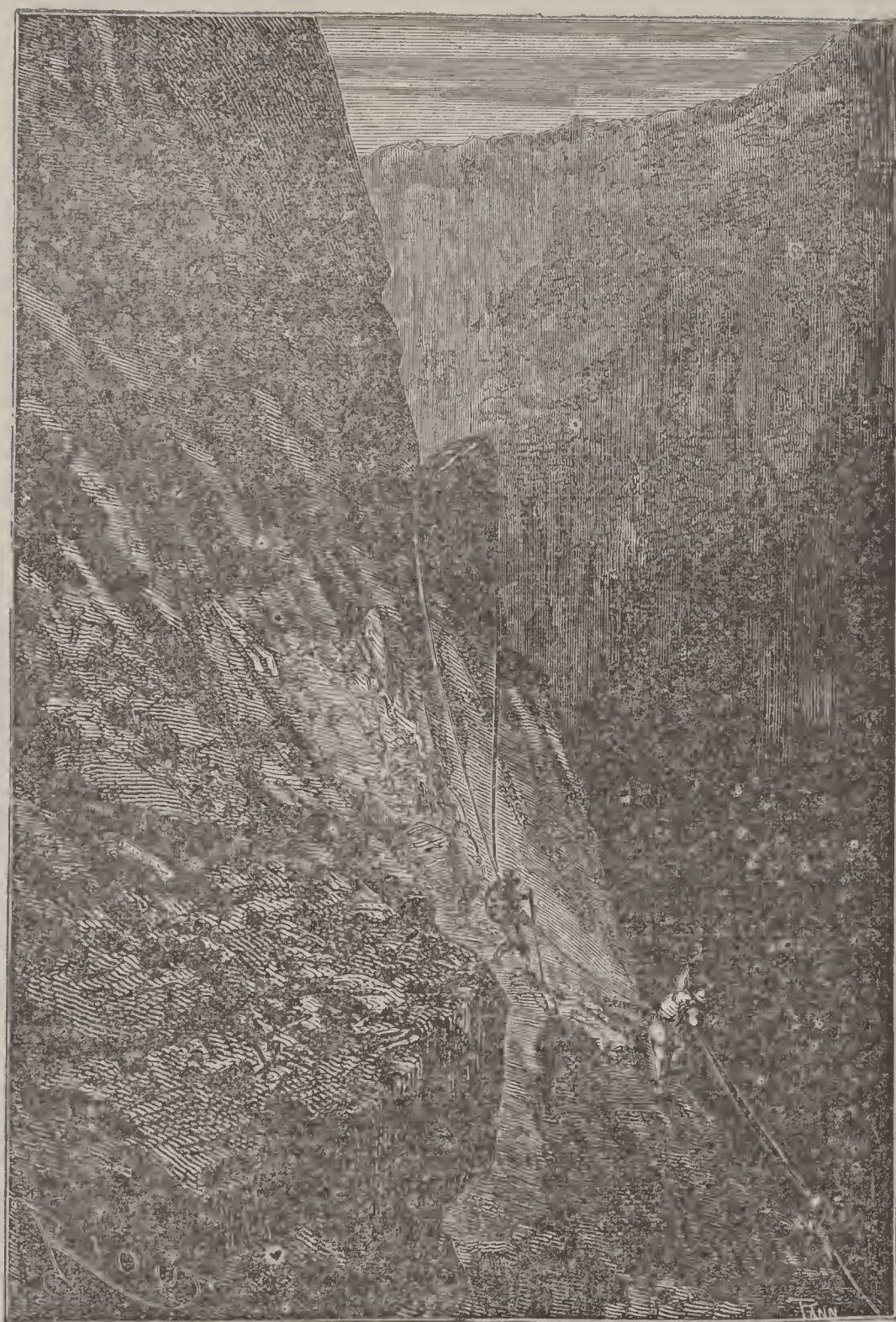
OUR real journey had now commenced.

Hitherto our courage and determination had overcome all difficulties. We were fatigued at times; and that was all. Now, unknown and fearful dangers we were about to encounter.

I had not as yet ventured to take a glimpse down the horrible abyss into which in a few minutes more I was about to plunge. The fatal moment had, however, at last arrived. I had still the option of refusing or accepting a share in this foolish and audacious enterprise. But I was ashamed to show more fear than the eider-duck hunter. Hans seemed to accept the difficulties of the journey so tranquilly, with such calm indifference, with such perfect recklessness of all danger, that I actually blushed to appear less of a man than he!

Had I been alone with my uncle, I should certainly have sat down and argued the point fully; but in the presence of the guide I held my tongue. I gave one moment to the thought of my charming cousin, and then I advanced to the mouth of the central shaft.

It measured about a hundred feet in diameter, which made about three hundred in circumference. I leaned over a rock which stood on its edge, and looked down. My hair stood on end, my teeth chattered, my limbs trembled, I seemed utterly to lose my centre of gravity, while my head was in a sort of whirl, like that of a drunken man. There is nothing more powerful than this attraction towards an abyss. I was about to fall headlong into the gaping well, when I was drawn back by a firm and powerful hand. It was that of Hans. I had



THE DESCENT OF THE CRATER.

not taken lessons enough at the Frelser's-kirk of Copenhagen in the art of looking down from lofty eminences without blinking!

However, few as the minutes were during which I gazed down this tremendous and even wondrous shaft, I had a sufficient glimpse of it to give me some idea of its physical conformation. Its sides, which were almost as perpendicular as those of a well, presented numerous projections which doubtless would assist our descent.

It was a sort of wild and savage staircase, without bannister or fence. A rope fastened above, near the surface, would certainly support our weight and enable us to reach the bottom, but how, when we had arrived at its utmost depth, were we to loosen it above? This was, I thought, a question of some importance.

My uncle, however, was one of those men who are nearly always prepared with expedients. He hit upon a very simple method of obviating this difficulty. He unrolled a cord about as thick as my thumb, and at least four hundred feet in length. He allowed about half of it to go down the pit and catch in a hitch over a great block of lava which stood on the edge of the precipice. This done, he threw the second half after the first.

Each of us could now descend by catching the two cords in one hand. When about two hundred feet below, all the explorer had to do was to let go one end and pull away at the other, when the cord would come falling at his feet. In order to go down farther, all that was necessary was to continue the same operation.

This was a very excellent proposition, and no doubt, a correct one. Going down appeared to me easy enough, it was the coming up again that now occupied my thoughts.

"Now," said my uncle, as soon as he had completed this important preparation, "let us see about the baggage. It must be divided into three separate parcels, and each

of us must carry one on his back. I allude to the more important and fragile articles."

My worthy and ingenious uncle did not appear to consider that we came under that denomination.

"Hans," he continued, "you will take charge of the tools and some of the provisions; you, Harry, must take possession of another third of the provisions and of the arms. I will load myself with the rest of the eatables, and with the more delicate instruments."

"But," I exclaimed, "our clothes, this mass of cord and ladders—who will undertake to carry them down?"

"They will go down of themselves."

"And how so?" I asked.

"You shall see."

My uncle was not fond of half measures, nor did he like anything in the way of hesitation. Giving his orders to Hans he had the whole of the non-fragile articles made up into one bundle; and the packet, firmly and solidly fastened, was simply pitched over the edge of the gulf.

I heard the moaning of the suddenly displaced air, and the noise of falling stones. My uncle leaning over the abyss followed the descent of his luggage with a perfectly self-satisfied air, and did not rise until it had completely disappeared from sight.

"Now then," he cried, "it is our turn."

I put it in good faith to any man of common sense—was it possible to hear this energetic cry without a shudder?

The Professor fastened his case of instruments on his back. Hans took charge of the tools, I of the arms. The descent then commenced in the following order: Hans went first, my uncle followed, and I went last. Our progress was made in profound silence—a silence only troubled by the fall of pieces of rock, which breaking from the jagged sides, fell with a roar into the depths below.

I allowed myself to slide, so to speak, holding franti-

cally on the double cord with one hand and with the other keeping myself off the rocks by the assistance of my iron-shod pole. One idea was all the time impressed upon my brain. I feared that the upper support would fail me. The cord appeared to me far too fragile to bear the weight of three such persons as we were, with our luggage. I made as little use of it as possible, trusting to my own agility and doing miracles in the way of feats of dexterity and strength upon the projecting shelves and spurs of lava which my feet seemed to clutch as strongly as my hands.

The guide went first I have said, and when one of the slippery and frail supports broke from under his feet he had recourse to his usual monosyllabic way of speaking.

“Gifakt——”

“Attention—look out,” repeated my uncle.

In about half an hour we reached a kind of small terrace formed by a fragment of rock projecting some distance from the sides of the shaft.

Hans now began to haul upon the cord on one side only, the other going as quietly upward as the other came down. It fell at last, bringing with it a shower of small stones, lava and dust, a disagreeable kind of rain or hail.

While we were seated on this extraordinary bench I ventured once more to look downwards. With a sigh I discovered that the bottom was still wholly invisible. Were we, then, going direct to the interior of the earth?

The performance with the cord recommenced, and a quarter of an hour later we had reached to the depth of another two hundred feet.

I have very strong doubts if the most determined geologist would, during that descent have studied the nature of the different layers of earth around him. I did not trouble my head much about the matter; whether we were among the combustible carbon, silurians, or primitive soil, I neither knew nor cared to know.

Not so the inveterate Professor. He must have taken notes all the way down, for, at one of our halts, he began a brief lecture.

"The farther we advance," said he, "the greater is my confidence in the result. The disposition of these volcanic strata absolutely confirms the theories of Sir Humphrey Davy. We are still within the region of the primordial soil, the soil in which took place the chemical operation of metals becoming inflamed by coming in contact with the air and water. I at once regret the old and now for ever exploded theory of a central fire. At all events, we shall soon know the truth."

Such was the everlasting conclusion to which he came. I, however, was very far from being in humor to discuss the matter. I had something else to think of. My silence was taken for consent; and still we continued to go down.

At the expiration of three hours, we were, to all appearance, as far off as ever from the bottom of the well. When I looked upwards, however, I could see that the upper orifice was every minute decreasing in size. The sides of the shaft were getting closer and closer together, we were approaching the regions of eternal night!

And still we continued to descend!

At length, I noticed that when pieces of stone were detached from the sides of this stupendous precipice, they were swallowed up with less noise than before. The final sound was sooner heard. We were approaching the bottom of the abyss!

As I had been very careful to keep account of all the changes of cord which took place, I was able to tell exactly what was the depth we had reached, as well as the time it had taken.

We had shifted the rope twenty-eight times, each operation taking a quarter of an hour, which in all made seven

hours. To this had to be added twenty-eight pauses; in all ten hours and a-half. We started at one, it was now, therefore, about eleven o'clock at night.

It does not require great knowledge of arithmetic to know that twenty-eight times two hundred feet makes five thousand six hundred feet in all (more than an English mile.)

While I was making this mental calculation a voice broke the silence. It was the voice of Hans.

"Halt!" he cried.

I checked myself very suddenly, just at the moment when I was about to kick my uncle on the head.

"We have reached the end of our journey," said the worthy Professor in a satisfied tone.

"What, the interior of the earth?" said I, slipping down to his side.

"No, you stupid fellow! but we have reached the bottom of the well."

"And I suppose there is no farther progress to be made?" I hopefully exclaimed.

"Oh, yes, I can dimly see a sort of tunnel, which turns off obliquely to the right. At all events, we must see about that to-morrow. Let us sup now, and seek slumber as best we may."

I thought it time, but made no observations on that point. I was fairly launched on a desperate course, and all I had to do was to go forward hopefully and trustingly.

It was not even now quite dark, the light filtering down in a most extraordinary manner.

We opened the provision bag, ate a frugal supper, and each did his best to find a bed amid the pile of stones, dirt, and lava which had accumulated for ages at the bottom of the shaft.

I happened to grope out the pile of ropes, ladders, and

clothes which we had thrown down; and upon them I stretched myself. After such a day's labor, my rough bed seemed as soft as down!

For a while I lay in a sort of pleasant trance.

Presently, after lying quietly for some minutes, I opened my eyes and looked upwards. As I did so I made out a brilliant little dot, at the extremity of this long, gigantic telescope.

It was a star without scintillating rays. According to my calculation, must be β in the constellation of the Little Bear.

After this little bit of astronomical recreation, I dropped into a sound sleep.

CHAPTER XV.

WE CONTINUE OUR DESCENT.

AT eight o'clock the next morning, a faint kind of dawn of day awoke us. The thousand and one prisms of the lava, collected the light as it passed and brought it to us like a shower of sparks.

We were able with ease to see objects around us.

"Well, Harry, my boy," cried the delighted Professor, rubbing his hands together, "what say you now? Did you ever pass a more tranquil night in our house in the König Strasse? No deafening sounds of cart-wheels, no cries of hawkers, no bad language from boatmen or watermen!"

"Well, uncle, we are quiet at the bottom of this well—but to me there is something terrible in this calm."

"Why," said the Professor, hotly, "one would say you were already beginning to be afraid. How will you get on presently? Do you know, that as yet, we have not penetrated one inch into the bowels of the earth."

"What can you mean, sir?" was my bewildered and astonished reply.

"I mean to say that we have only just reached the soil of the island itself. This long vertical tube, which ends at the bottom of the crater of Sneffels, ceases here just about on a level with the sea."

"Are you sure, sir?"

"Quite sure. Consult the barometer."

It was quite true that the mercury, after rising gradually in the instrument, as long as our descent was taking place, had stopped precisely at twenty-nine degrees.

"You perceive," said the Professor, "we have as yet

only to endure the pressure of air. I am curious to replace the barometer by the manometer."

The barometer, in fact, was about to become useless—as soon as the weight of the air was greater than what was calculated as above the level of the ocean.

"But," said I, "is it not very much to be feared that this ever-increasing pressure may not in the end turn out very painful and inconvenient?"

"No," said he. "We shall descend very slowly, and our lungs will be gradually accustomed to breathe compressed air. It is well known that aëronauts have gone so high as to be nearly without air at all—why, then, should we not accustom ourselves to breathe when we have, say, a little too much of it? For myself, I am certain I shall prefer it. Let us not lose a moment. Where is the packet which preceded us in our descent?"

I smilingly pointed it out to my uncle. Hans had not seen it, and believed it caught somewhere above us: "huppe" as he phrased it.

"Now," said my uncle, "let us breakfast, and breakfast like people who have a long day's work before them."

Biscuit and dried meat, washed down by some mouthfuls of water flavored with schiedam, was the material of our luxurious meal.

As soon as it was finished, my uncle took from his pocket a note-book destined to be filled by memoranda of our travels. He had already placed his instruments in order, and this is what he wrote:—

Monday, July 1st.

Chronometer, 8h. 17m. morning.

Barometer, 29 degrees.

Thermometer, 43° Fahr.

Direction, E. S. E.

This last observation referred to the obscure gallery, and was indicated to us by the compass.

"Now Harry," cried the Professor, in an enthusiastic tone of voice, "we are truly about to take our first step into the Interior of the Earth; never before visited by man since the first creation of the world. You may consider, therefore, that at this precise moment our travels really commence."

As my uncle made this remark, he took in one hand the Ruhmkorf coil apparatus, which hung round his neck, and with the other he put the electric current into communication with the worm of the lantern. And a bright light at once illumined that dark and gloomy tunnel!

The effect was magical!

Hans, who carried the second apparatus, had it also put into operation. This ingenious application of electricity to practical purposes enabled us to move along by the light of an artificial day, amid even the flow of the most inflammable and combustible gases.

"Forward!" cried my uncle. Each took up his burden. Hans went first, my uncle followed, and I going third, we entered the sombre gallery!

Just as we were about to engulf ourselves in this dismal passage, I lifted up my head, and through the tube-like shaft saw that Iceland sky I was never to see again!

Was it the last I should ever see of any sky?

The stream of lava flowing from the bowels of the earth in 1229, had forced itself a passage through the tunnel. It lined the whole of the inside with its thick and brilliant coating. The electric light added very greatly to the brilliancy of the effect.

The great difficulty of our journey now began. How were we to prevent ourselves from slipping down the steeply-inclined plane? Happily some cracks, abrasures of the soil, and other irregularities, served the place of steps; and we descended slowly; allowing our heavy luggage to slip on before, at the end of a long cord.

But that which served as steps under our feet, became in other places stalactites. The lava, very porous in certain places, took the form of little round blisters. Crystals of opaque quartz, adorned with limpid drops of natural glass suspended to the roof like lustres, seemed to take fire as we passed beneath them. One would have fancied that the genii of romance were illuminating their underground palaces to receive the sons of men.

"Magnificent, glorious!" I cried in a moment of involuntary enthusiasm, "what a spectacle, uncle! Do you not admire these variegated shades of lava, which run through a whole series of colors, from reddish brown to pale yellow—by the most insensible degrees? And these crystals, they appear like luminous globes."

"You are beginning to see the charms of travel, Master Harry," cried my uncle. "Wait a bit, until we advance farther. What we have as yet discovered is nothing—onwards, my boy, onwards!"

It would have been a far more correct and appropriate expression, had he said, "let us slide," for we were going down an inclined plane with perfect ease. The compass indicated that we were moving in a south-easterly direction. The flow of lava had never turned to the right or the left. It had the inflexibility of a straight line.

Nevertheless, to my surprise, we found no perceptible increase in heat. This proved the theories of Humphrey Davy to be founded on truth, and more than once I found myself examining the thermometer in silent astonishment.

Two hours after my departure it only marked 54 degrees Fahrenheit. I had every reason to believe from this that our descent was far more horizontal than vertical. As for discovering the exact depth to which we had attained, nothing could be easier. The Professor, as he advanced measured the angles of deviation and inclination; but he kept the result of his observations to himself.

About eight o'clock in the evening, my uncle gave the signal for halting. Hans seated himself on the ground. The lamps were hung to fissures in the lava rock. We were now in a large cavern where air was not wanting. On the contrary, it abounded. What could be the cause of this—to what atmospheric agitation could be ascribed this draught? But this was a question which I did not care to discuss just then. Fatigue and hunger made me incapable of reasoning. An unceasing march of seven hours had not been kept up without great exhaustion. I was really and truly worn out; and delighted enough I was to hear the word Halt.

Hans laid out some provisions on a lump of lava, and we each supped with keen relish. One thing, however, caused us great uneasiness—our water reserve was already half exhausted. My uncle had full confidence in finding subterranean resources, but hitherto we had completely failed in so doing. I could not help calling my uncle's attention to the circumstance.

"And you are surprised at this total absence of springs?" he said.

"Doubtless—I am very uneasy on the point. We have certainly not enough water to last us five days."

"Be quite easy on that matter," continued my uncle. "I answer for it we shall find plenty of water—in fact, far more than we shall want."

"But when?"

"When we once get through this crust of lava. How can you expect springs to force their way through these solid stone walls?"

"But what is there to prove that this concrete mass of lava does not extend to the centre of the earth? I don't think we have as yet done much in a vertical way."

"What puts that into your head, my boy?" asked my uncle, mildly.

"Well, it appears to me that if we had descended very far below the level of the sea—we should find it rather hotter than we have."

"According to your system," said my uncle; "but what does the thermometer say?"

"Scarcely 15 degrees by Reaumur, which is only an increase of 9 since our departure."

"Well, and what conclusion does that bring you to?" inquired the Professor.

"The deduction I draw from this is very simple. According to the most exact observations, the augmentation of the temperature of the interior of the earth is 1 degree for every hundred feet. But certain local causes may considerably modify this figure. Thus at Yakoust in Siberia, it has been remarked that the heat increases a degree every thirty-six feet. The difference evidently depends on the conductivity of certain rocks. In the neighborhood of an extinct volcano, it has been remarked that the elevation of temperature was only 1 degree on every five-and-twenty feet. Let us, then, go upon this calculation—which is the most favorable—and calculate."

"Calculate away, my boy."

"Nothing easier," said I, pulling out my note-book and pencil. "Nine times one hundred and twenty-five feet, make a depth of eleven hundred and twenty-five feet."

"Archimedes could not have spoken more geometrically."

"Well?"

"Well, according to my observations, we are at least ten thousand feet below the level of the sea."

"Can it be possible?"

"Either my calculation is correct, or there is no truth in figures."

The calculations of the Professor were perfectly correct. We were already six thousand feet deeper down in the

bowels of the earth than any one had ever been before. The lowest known depth to which man had hitherto penetrated was in the mines of Kitz-Bahl, on the Tyrol, and those of Wuttemberg in Bohemia.

The temperature, which should have been eighty-one, was in this place only fifteen. This was a matter for serious consideration.

CHAPTER XVI.

THE EASTERN TUNNEL.

THE next day was Tuesday, the 2d of July—and at six o'clock in the morning we resumed our journey.

We still continued to follow the gallery of lava, a perfect natural pathway, as easy of descent as some of those inclined planes which, in very old German houses, serve the purpose of staircases. This went on until seventeen minutes past twelve, the precise instant at which we rejoined Hans, who having been somewhat in advance, had suddenly stopped.

“At last,” cried my uncle, “we have reached the end of the shaft.”

I looked wonderingly about me. We were in the centre of four cross paths—sombre and narrow tunnels. The question now arose as to which it was wise to take; and this of itself was no small difficulty.

My uncle, who did not wish to appear to have any hesitation about the matter before myself or the guide, at once made up his mind. He pointed quietly to the eastern tunnel; and, without delay, we entered within its gloomy recesses.

Besides, had he entertained any feeling of hesitation it might have been prolonged indefinitely, for there was no indication by which to determine on a choice. It was absolutely necessary to trust to chance and good fortune!

The descent of this obscure and narrow gallery was very gradual and winding. Sometimes we gazed through a succession of arches, its course very like the aisles of a Gothic cathedral. The great artistic sculptors and builders

of the middle ages might have here completed their studies with advantage. Many most beautiful and suggestive ideas of architectural beauty would have been discovered by them. After passing through this phase of the cavernous way, we suddenly came, about a mile farther on, upon a square system of arch, adopted by the early Romans, projecting from the solid rock, and keeping up the weight of the roof.

Suddenly we would come upon a series of low subterranean tunnels which looked like beaver holes, or the work of foxes. Through whose narrow and winding ways we had literally to crawl!

The heat still remained at quite a supportable degree. With an involuntary shudder, I reflected on what the heat must have been when the volcano of Sneffels was pouring its smoke, flames, and streams of boiling lava—all of which must have come up by the road we were now following. I could imagine the torrents of hot seething stone darting on, bubbling up with accompaniments of smoke, steam, and sulphurous stench!

“Only to think of the consequences,” I mused, “if the old volcano were once more to set to work.”

I did not communicate these rather unpleasant reflections to my uncle. He not only would not have understood them, but would have been intensely disgusted. His only idea was to go ahead. He walked, he slid, he clambered over piles of fragments, he rolled down heaps of broken lava, with an earnestness and conviction it was impossible not to admire.

At six o'clock in the evening, after a very wearisome journey, but one not so fatiguing as before, we had made six miles towards the southward, but had not gone more than a mile downwards.

My uncle, as usual, gave the signal to halt. We ate our meal in thoughtful silence, and then retired to sleep.

Our arrangements for the night were very primitive and simple. A travelling rug, in which each rolled himself, was all our bedding. We had no necessity to fear cold or any unpleasant visit. Travellers who bury themselves in the wilds and depths of the African desert, who seek profit and pleasure in the forests of the New World, are compelled to take it in turn to watch during the hours of sleep; but in this region of the earth absolute solitude and complete security, reigned supreme.

We had nothing to fear either from savages or from wild beasts.

After a night's sweet repose, we awoke fresh and ready for action. There being nothing to detain us, we started on our journey. We continued to burrow through the lava tunnel as before. It was impossible to make out through what soil we were making way. The tunnel, moreover, instead of going down into the bowels of the earth, became absolutely horizontal.

I even thought, after some examination, that we were actually tending upwards. About ten o'clock in the day this state of things became so clear, that finding the change very fatiguing I was obliged to slacken my pace and finally to come to a halt.

"Well," said the Professor quickly, "what is the matter?"

"The fact is, I am dreadfully tired," was my earnest reply.

"What," cried my uncle, "tired after a three hours' walk, and by so easy a road?"

"Easy enough, I dare say, but very fatiguing."

"But how can that be, when all we have to do is to go downwards."

"I beg your pardon, sir. For some time I have noticed that we are going upwards."

"Upwards," cried my uncle, shrugging his shoulders, "how can that be?"

“There can be no doubt about it. For the last half hour the slopes have been upward—and if we go on in this way much longer we shall find ourselves back in Iceland.”

My uncle shook his head with the air of a man who does not want to be convinced. I tried to continue the conversation. He would not answer me, but once more gave the signal for departure. His silence I thought was only caused by concentrated ill-temper.

However this might be, I once more took up my load, and boldly and resolutely followed Hans, who was now in advance of my uncle. I did not like to be beaten or even distanced. I was naturally anxious not to lose sight of my companions. The very idea of being left behind, lost in that terrible labyrinth, made me shiver as with the ague.

Besides, if the ascending path was more arduous and painful to clamber, I had one source of secret consolation and delight. It was to all appearance taking us back to the surface of the earth. That of itself was hopeful. Every step I took confirmed me in my belief, and I began already to build castles in the air in relation to my marriage with my pretty little cousin.

About twelve o'clock there was a great and sudden change in the aspect of the rocky sides of the gallery. I first noticed it from the diminution of the rays of light which cast back the reflection of the lamp. From being coated with shining and resplendent lava, it became living rock. The sides were sloping walls, which sometimes became quite vertical.

We were now in what the geological professors call a state of transition, in the period of Silurian stones, so called because this specimen of early formation is very common in England in the counties formerly inhabited by the Celtic nation known as Silures.

"I can see, clearly now," I cried; "the sediment from the waters which once covered the whole earth, formed during the second period of its existence, these schists and these calcareous rocks. We are turning our backs on the granitic rocks, and are like people from Hamburg who would go to Lübeck by way of Hanover."

I might just as well have kept my observations to myself. My geological enthusiasm got the better, however, of my cooler judgment, and Professor Hardwigg heard my observations.

"What is the matter now?" he said, in a tone of great gravity.

"Well," cried I, "do you not see these different layers of calcareous rocks and the first indication of slate strata?"

"Well; what then?"

"We have arrived at that period of the world's existence when the first plants and the first animals made their appearance."

"You think so?"

"Yes, look; examine and judge for yourself."

I induced the Professor with some difficulty to cast the light of his lamp on the sides of the long winding gallery. I expected some exclamation to burst from his lips. I was very much mistaken. The worthy Professor never spoke a word.

It was impossible to say whether he understood me or not. Perhaps it was possible that in his pride—my uncle and a learned professor—he did not like to own that he was wrong in having chosen the eastern tunnel, or was he determined at any price to go to the end of it? It was quite evident we had left the region of lava, and that the road by which we were going could not take us back to the great crater of Mount Sneffels.

As we went along I could not help ruminating on the

whole question, and asked myself if I did not lay too great a stress on these sudden and peculiar modifications of the earth's crust.

After all, I was very likely to be mistaken—and it was within the range of probability and possibility, that we were not making our way through the strata of rocks which I believed I recognized piled on the lower layer of granitic formation.

“At all events, if I am right,” I thought to myself, “I must certainly find some remains of primitive plants, and it will be absolutely necessary to give way to such indubitable evidence. Let us have a good search.”

I accordingly lost no opportunity of searching, and had not gone more than about a hundred yards, when the evidence I sought for cropped up in the most incontestable manner before my eyes. It was quite natural that I should expect to find these signs, for during the Silurian period the seas contained no fewer than fifteen hundred different animal and vegetable species. My feet so long accustomed to the hard and arid lava soil, suddenly found themselves treading on a kind of soft dust, the remains of plants and shells.

Upon the walls themselves I could clearly make out the outline, as plain as a sun picture, of the fucus and the lycopodes. The worthy and excellent Professor Hardwigg could not of course make any mistake about the matter; but I believe he deliberately closed his eyes, and continued on his way with a firm and unalterable step.

I began to think that he was carrying his obstinacy a great deal too far. I could no longer act with prudence or composure. I stooped on a sudden and picked up an almost perfect shell, which had undoubtedly belonged to some animal very much resembling some of the present day. Having secured the prize, I followed in the wake of my uncle.

"Do you see this?" I said.

"Well," said the Professor, with the most imperturbable tranquillity, "it is the shell of a crustaceous animal of the extinct order of the trilobites; nothing more I assure you."

"But," cried I, much troubled at his coolness, "do you draw no conclusion from it?"

"Well, if I may ask, what conclusion do you draw from it yourself?"

"Well, I thought ——"

"I know, my boy, what you would say, and you are right, perfectly and incontestably right. We have finally abandoned the crust of lava and the road by which the lava ascended. It is quite possible that I may have been mistaken, but I shall be unable to discover my error until I get to the end of this gallery."

"You are quite right as far as that is concerned," I replied, "and I should highly approve of your decision, if we had not to fear the greatest of all dangers."

"And what is that?"

"Want of water."

"Well, my dear Henry, it can't be helped. We must put ourselves on rations."

And on he went.

CHAPTER XVII.

DEEPER AND DEEPER—THE COAL MINE.

IN truth, we were compelled to put ourselves upon rations. Our supply would certainly last not more than three days. I found this out about supper time. The worst part of the matter was, that in what is called the transition rocks, it was hardly to be expected we should meet with water!

I had read of the horrors of thirst, and I knew that where we were, a brief trial of its sufferings would put an end to our adventures—and our lives! But it was utterly useless to discuss the matter with my uncle. He would have answered by some axiom from Plato.

During the whole of next day we proceeded on our journey through this interminable gallery, arch after arch, tunnel after tunnel. We journeyed without exchanging a word. We had become as mute and reticent as Hans our guide.

The road had no longer an upward tendency; at all events, if it had, it was not to be made out very clearly. Sometimes there could be no doubt that we were going downwards. But this inclination was scarcely to be distinguished, and was by no means reassuring to the Professor, because the character of the strata was in no wise modified, and the transition character of the rocks became more and more marked.

It was a glorious sight to see how the electric light brought out the sparkles in the walls of the calcareous rocks, and the old red sandstone. One might have fancied oneself in one of those deep cuttings in Devonshire, which

have given their name to this kind of soil. Some magnificent specimens of marble projected from the sides of the gallery ; some of an agate grey with white veins of variegated character, others of a yellow spotted color, with red veins ; farther off might be seen samples of color in which cherry-tinted seams were to be found in all their brightest shades.

The greater number of these marbles were stamped with the marks of primitive animals. Since the previous evening, nature and creation had made considerable progress. Instead of the rudimentary trilobites, I perceived the remains of a more perfect order. Among others, the fish in which the eye of a geologist has been able to discover the first form of the reptile.

The Devonian seas were inhabited by a vast number of animals of this species, which were deposited in tens of thousands in the rocks of new formation.

It was quite evident to me that we were ascending the scale of animal life of which man forms the summit. My excellent uncle, the Professor, appeared not to take notice of these warnings. He was determined at any risk to proceed.

He must have been in expectation of one of two things ; either that a vertical well was about to open under his feet, and thus allow him to continue his descent, or that some insurmountable obstacle would compel us to stop and go back by the road we had so long travelled. But evening came again, and, to my horror, neither hope was doomed to be realized !

On Friday, after a night when I began to feel the gnawing agony of thirst, and when in consequence appetite decreased, our little band rose and once more followed the turnings and windings, the ascents and descents, of this interminable gallery. All were silent and gloomy. I could see that even my uncle had ventured too far.

After about ten hours of further progress,—a progress dull and monotonous to the last degree—I remarked that the reverberation, and reflection of our lamps upon the sides of the tunnel had singularly diminished. The marble, the schist, the calcareous rocks, the red sandstone, had disappeared, leaving in their places a dark and gloomy wall, sombre and without brightness. When we reached a remarkably narrow part of the tunnel, I leaned my left hand against the rock.

When I took my hand away, and happened to glance at it, it was quite black. We had reached the coal strata of the Central Earth.

“A coal mine!” I cried.

“A coal mine without miners,” responded my uncle, a little severely.

“How can we tell?”

“I can tell,” replied my uncle, in a sharp and doctorial tone. “I am perfectly certain that this gallery through successive layers of coal, was not cut by the hand of man. But whether it is the work of nature or not is of little concern to us. The hour for our evening meal has come—let us sup.”

Hans, the guide, occupied himself in preparing food. I had come to that point when I could no longer eat. All I cared about were the few drops of water which fell to my share. What I suffered it is useless to record. The guide’s gourd, not quite half full, was all that was left for us three!

Having finished their repast, my two companions laid themselves down upon their rugs, and found in sleep a remedy for their fatigue and sufferings. As for me, I could not sleep, I lay counting the hours until morning.

The next morning, Saturday, at six o’clock, we started again. Twenty minutes later we suddenly came upon a vast excavation. From its mighty extent I saw at once

that the hand of man could have had nothing to do with this coal mine ; the vault above would have fallen in ; as it was, it was only held together by some miracle of nature.

This mighty natural cavern was about a hundred feet wide, by about a hundred and fifty high. The earth had evidently been cast apart by some violent subterranean commotion. The mass, giving way to some prodigious upheaving of nature, had split in two, leaving the vast gap into which we inhabitants of the earth had penetrated for the first time.

The whole singular history of the coal period was written on those dark and gloomy walls. A geologist would have been able easily to follow the different phases of its formation. The seams of coal were separated by strata of sandstone, a compact clay, which appeared to be crushed down by the weight from above.

At that period of the world which preceded the secondary epoch, the earth was covered by a coating of enormous and rich vegetation, due to the double action of tropical heat and perpetual humidity. A vast atmospheric cloud of vapor surrounded the earth on all sides, preventing the rays of the sun from ever reaching it.

Hence the conclusion that these intense heats did not arise from this new source of caloric.

Perhaps even the star of day was not quite ready for its brilliant work—to illumine a universe. Climates did not as yet exist, and a level heat pervaded the whole surface of the globe—the same heat existing at the north pole as at the equator.

Whence did it come ? From the interior of the earth ?

In spite of all the learned theories of Professor Hardwigg, a fierce and vehement fire certainly burned within the entrails of the great spheroid. Its action was felt even to the very topmost crust of the earth ; the plants then in existence being deprived of the vivifying rays of the sun,

had neither buds, nor flowers, nor odor, but their roots drew a strong and vigorous life from the burning earth of early days.

There were but few of what may be called trees—only herbaceous plants, immense turfs, briars, mosses, rare families, which however in those days were counted by tens and tens of thousands.

It is entirely to this exuberant vegetation that coal owes its origin. The crust of the vast globe still yielded under the influence of the seething, boiling mass, which was for ever at work beneath. Hence arose numerous fissures, and continual falling in of the upper earth. The dense mass of plants being beneath the waters, soon formed themselves into vast agglomerations.

Then came about the action of natural chemistry; in the depths of the ocean the vegetable mass at first became turf, then, thanks to the influence of gases and subterranean fermentation, they underwent the complete process of mineralization.

In this manner, in early days, were formed those vast and prodigious layers of coal, which an ever-increasing consumption must utterly use up in about three centuries more, if people do not find some more economic light than gas, and some cheaper motive power than steam.

All these reflections, the memories of my school studies, came to my mind while I gazed upon these mighty accumulations of coal, whose riches however are scarcely likely to be ever utilized. The working of these mines could only be carried out at an expense that would never yield a profit.

The matter, however, is scarcely worthy consideration, when coal is scattered over the whole surface of the globe, within a few yards of the upper crust. As I looked at these untouched strata, therefore, I knew they would remain as long as the world lasts.

While we still continued our journey, I alone forgot the length of the road, by giving myself up wholly to these geological considerations. The temperature continued to be very much the same as while we were travelling amid the lava and the schists. On the other hand my sense of smell was much affected by a very powerful odor. I immediately knew that the gallery was filled to overflowing with that dangerous gas the miners call fire-damp, the explosion of which has caused such fearful and terrible accidents, making a hundred widows, and hundreds of orphans in a single hour.

Happily, we were able to illumine our progress by means of the Ruhmkorf apparatus. If we had been so rash and imprudent as to explore this gallery, torch in hand, a terrible explosion would have put an end to our travels, simply because no travellers would be left.

Our excursion through this wondrous coal mine in the very bowels of the earth lasted until evening. My uncle was scarcely able to conceal his impatience and dissatisfaction at the road continuing still to advance in a horizontal direction.

The darkness, dense and opaque, a few yards in advance and in the rear, rendered it impossible to make out what was the length of the gallery. For myself, I began to believe that it was simply interminable, and would go on in the same manner for months.

Suddenly, at six o'clock, we stood in front of a wall. To the right, to the left, above, below, nowhere was there any passage. We had reached a spot where the rocks said in unmistakable accents—No Thoroughfare.

I stood stupefied. The guide simply folded his arms. My uncle was silent.

"Well, well, so much the better," cried my uncle, at last, "I now know what we are about. We are decidedly not upon the road followed by Saknussem. All

we have to do is to go back. Let us take one night's good rest, and before three days are over, I promise you we shall have regained the point where the galleries divided."

"Yes, we may, if our strength lasts as long," I cried, in a lamentable voice.

"And why not?"

"To-morrow, among us three, there will not be a drop of water. It is just gone."

"And your courage with it," said my uncle, speaking in a severe tone.

What could I say? I turned round on my side, and from sheer exhaustion fell into a heavy but troubled sleep. Dreams of water! And I awoke unrefreshed.

I would have bartered a diamond mine for a glass of pure spring water!

CHAPTER XVIII.

THE WRONG ROAD!

NEXT day, our departure took place at a very early hour. There was no time for the least delay. According to my account, we had five days' hard work to get back to the place where the galleries divided.

I can never tell all the sufferings we endured upon our return. My uncle bore them like a man who has been in the wrong—that is, with concentrated and suppressed anger; Hans, with all the resignation of his pacific character; and I—I confess that I did nothing but complain, and despair. I had no heart for this bad fortune.

But there was one consolation. Defeat at the outset would probably upset the whole journey!

As I had expected from the first, our supply of water gave completely out on our first day's march. Our provision of liquids was reduced to our supply of schiedam; but this horrible—nay, I will say it—this infernal liquor burnt the throat, and I could not even bear the sight of it. I found the temperature to be stifling. I was paralyzed with fatigue. More than once I was about to fall insensible to the ground. The whole party then halted, and the worthy Iclander and my excellent uncle did their best to console and comfort me. I could, however, plainly see that my uncle was contending painfully against the extreme fatigues of our journey, and the awful torture generated by the absence of water.

At length a time came when I ceased to recollect anything—when all was one awful, hideous, fantastic dream!

At last, on Tuesday, the eighth of the month of July, after crawling on our hands and knees for many hours,

more dead than alive, we reached the point of junction between the galleries. I lay like a log, an inert mass of human flesh on the arid lava soil. It was then ten in the morning.

Hans and my uncle, leaning against the wall, tried to nibble away at some pieces of biscuit, while deep groans and sighs escaped from my scorched and swollen lips. Then I fell off into a kind of deep lethargy.

Presently I felt my uncle approach, and lift me up tenderly in his arms.

"Poor boy," I heard him say in a tone of deep commiseration.

I was profoundly touched by these words, being by no means accustomed to signs of womanly weakness in the Professor. I caught his trembling hands in mine and gave them a gentle pressure. He allowed me to do so without resistance, looking at me kindly all the time. His eyes were wet with tears.

I then saw him take the gourd which he wore at his side. To my surprise, or rather to my stupefaction, he placed it to my lips.

"Drink, my boy," he said.

Was it possible my ears had not deceived me? Was my uncle mad? I looked at him, with, I am sure, quite an idiotic expression. I would not understand him. I too much feared the counteraction of disappointment.

"Drink," he said again.

Had I heard aright? Before, however, I could ask myself the question a second time, a mouthful of water cooled my parched lips and throat—one mouthful, but I do believe it brought me back to life.

I thanked my uncle by clasping my hands. My heart was too full to speak.

"Yes," said he, "one mouthful of water, the very last—do you hear, my boy—the very last! I have taken

care of it at the bottom of my bottle as the apple of my eye. Twenty times, a hundred times, I have resisted the fearful desire to drink it. But—no—no, Harry, I saved it for you.”

“My dear uncle,” I exclaimed, and the big tears rolled down my hot and feverish cheeks.

“Yes, my poor boy, I knew that when you reached this place, this cross road in the earth, you would fall down half-dead, and I saved my last drop of water in order to restore you.”

“Thanks,” I cried; “thanks from my heart.”

As little as my thirst was really quenched, I had nevertheless partially recovered my strength. The contracted muscles of my throat relaxed—and the inflammation of my lips in some measure subsided. At all events, I was able to speak.

“Well,” I said, “there can be no doubt now as to what we have to do. Water has utterly failed us; our journey is therefore at an end. Let us return.”

While I spoke thus, my uncle evidently avoided my face: he held down his head; his eyes were turned in every possible direction but the right one.

“Yes,” I continued, getting excited by my own words, “we must go back to Sneffels. May heaven give us strength to enable us once more to revisit the light of day. Would that we now stood on the summit of the crater.”

“Go back,” said my uncle speaking to himself—“and must it be so?”

“Go back—yes, and without losing a single moment,” I vehemently cried.

For some moments there was silence under that dark and gloomy vault.

“So, my dear Harry,” said the Professor in a very singular tone of voice, “those few drops of water have not sufficed to restore your energy and courage.”



THE LAST DROP OF WATER.



“Courage!” I cried.

“I see that you are quite as downcast as before—and still give way to discouragement and despair.”

What, then, was the man made of, and what other projects were entering his fertile and audacious brain!

“You are not discouraged, sir?”

“What! give up just as we are on the verge of success,” he cried, “never, never shall it be said that Professor Hardwigg retreated.”

“Then we must make up our minds to perish,” I cried with a helpless sigh.

“No, Harry, my boy, certainly not. Go, leave me, I am very far from desiring your death. Take Hans with you. *I will go on alone.*”

“You ask us to leave you?”

“Leave me, I say. I have undertaken this dangerous and perilous adventure. I will carry it to the end—or I will never return to the surface of Mother Earth. Go,—Harry—once more I say to you—go!”

My uncle as he spoke was terribly excited. His voice, which before had been tender, almost womanly, became harsh and menacing. He appeared to be struggling with desperate energy against the impossible. I did not wish to abandon him at the bottom of that abyss, while, on the other hand, the instinct of preservation told me to fly.

Meanwhile, our guide was looking on with profound calmness and indifference. He appeared to be an unconcerned party, and yet he perfectly well knew what was going on between us. Our gestures sufficiently indicated the different roads each wished to follow—and which each tried to influence the other to undertake. But Hans appeared not to take the slightest interest in what was really a question of life and death for us all, but waited quite ready to obey the signal which should say go aloft, or to resume his desperate journey into the interior of the earth.

How then I wished with all my heart and soul that I could make him understand my words. My representations, my sighs and groans, the earnest accents in which I should have spoken would have convinced that cold hard nature. Those fearful dangers and perils of which the stolid guide had no idea, I would have pointed them out to him—I would have, as it were, made him see and feel. Between us, we might have convinced the obstinate Professor. If the worst had come to the worst, we could have compelled him to return to the summit of Sneffels.

I quietly approached Hans. I caught his hand in mine. He never moved a muscle. I indicated to him the road to the top of the crater. He remained motionless. My panting form, my haggard countenance, must have indicated the extent of my sufferings. The Icelandic gently shook his head and pointed to my uncle.

“*Master,*” he said.

The word is Icelandic as well as English.

“The master!” I cried, beside myself with fury—“madman! no—I tell you he is not the master of our lives; we must fly! we must drag him with us! do you hear me? Do you understand me, I say?”

I have already explained that I held Hans by the arm. I tried to make him rise from his seat. I struggled with him and tried to force him away. My uncle now interposed.

“My good Henry, be calm,” he said. “You will obtain nothing from my devoted follower; therefore, listen to what I have to say.”

I folded my arms, as well as I could, and looked my uncle full in the face.

“This wretched want of water,” he said, “is the sole obstacle to the success of my project. In the entire gallery, composed of lava, schist, and coal, it is true we found not one liquid molecule. It is quite possible that we may be more fortunate in the western tunnel.”

My sole reply was to shake my head with an air of incredulity.

"Listen to me to the end," said the Professor in his well-known lecturing voice. "While you lay yonder without life or motion, I undertook a reconnoitering journey into the conformation of this other gallery. I have discovered that it goes directly downwards into the bowels of the earth, and in a few hours will take us to the old granitic formation. In this we shall undoubtedly find innumerable springs. The nature of the rock makes this a mathematical certainty, and instinct agrees with logic to say that it is so. Now, this is the serious proposition which I have to make to you. When Christopher Columbus asked of his men three days to discover the land of promise, his men ill, terrified, and hopeless, yet gave him three days—and the New World was discovered. Now I, the Christopher Columbus of this subterranean region, only ask of you one more day. If, when that time is expired, I have not found the water of which we are in search, I swear to you, I will give up my mighty enterprise and return to the earth's surface."

Despite my irritation and despair, I knew how much it cost my uncle to make this proposition, and to hold such conciliatory language. Under the circumstances, what could I do, but yield?

"Well," I cried, "let it be as you wish, and may heaven reward your superhuman energy. But as, unless we discover water, our hours are numbered, let us lose no time, but go ahead."

CHAPTER XIX.

THE WESTERN GALLERY—A NEW ROUTE.

OUR descent was now resumed by means of the second gallery. Hans took up his post in front as usual. We had not gone more than a hundred yards when the Professor carefully examined the walls.

“This is the primitive formation—we are on the right road—onwards is our hope!”

When the whole earth got cool in the first hours of the world's morning, the diminution of the volume of the earth produced a state of dislocation in its upper crust, followed by ruptures, crevasses and fissures. The passage was a fissure of this kind, through which, ages ago, had flowed the eruptive granite. The thousand windings and turnings formed an inextricable labyrinth through the ancient soil.

As we descended, successions of layers composing the primitive soil appeared with the utmost fidelity of detail. Geological science considers this primitive soil as the base of the mineral crust, and it has recognised that it is composed of three different strata or layers, all resting on the immovable rock known as granite.

No mineralogists had ever found themselves placed in such a marvellous position to study nature in all her real and naked beauty. The sounding rod, a mere machine, could not bring to the surface of the earth the objects of value for the study of its internal structure, which we were about to see with our own eyes, to touch with our own hands.

Remember that I am writing this *after* the journey.

Across the streak of the rocks, colored by beautiful green tints, wound metallic threads of copper, of manga-

nese, with traces of platinum and gold. I could not help gazing at these riches buried in the entrails of mother earth, and of which no man would have the enjoyment to the end of time! These treasures—mighty and inexhaustible, were buried in the morning of the earth's history, at such awful depths, that no crowbar or pickaxe will ever drag them from their tomb!

The light of our Ruhmkorf's coil, increased tenfold by the myriad of prismatic masses of rock, sent their jets of fire in every direction, and I could fancy myself travelling through a huge hollow diamond, the rays of which produced myriads of extraordinary effects.

Towards six o'clock, this festival of light began sensibly and visibly to decrease, and soon almost ceased. The sides of the gallery assumed a crystallized tint, with a sombre hue; white mica began to commingle more freely with feldspar and quartz, to form what may be called the true rock—the stone which is hard above all, that supports, without being crushed, the four stories of the earth's soil.

We were walled by an immense prison of granite!

It was now eight o'clock, and still there was no sign of water. The sufferings I endured were horrible. My uncle now kept at the head of our little column. Nothing could induce him to stop. I, meanwhile, had but one real thought. My ear was keenly on the watch to catch the sound of a spring. But no pleasant sound of falling water fell upon my listening ear.

But at last the time came when my limbs refused to longer carry me. I contended heroically against the terrible tortures I endured, because I did not wish to compel my uncle to halt. To him I knew this would be the last fatal stroke.

Suddenly I felt a deadly faintness come over me. My eyes could no longer see; my knees shook. I gave one despairing cry—and fell!

“Help, help, I am dying!”

My uncle turned and slowly retraced his steps. He looked at me with folded arms, and then allowed one sentence to escape, in hollow accents, from his lips—

“All is over.”

The last thing I saw was a face fearfully distorted with pain and sorrow; and then my eyes closed.

When I again opened them, I saw my companions lying near me, motionless, wrapped in their huge travelling rugs. Were they asleep or dead? For myself, sleep was wholly out of the question. My fainting fit over, I was wakeful as the lark. I suffered too much for sleep to visit my eyelids—the more, that I thought myself sick unto death—dying. The last words spoken by my uncle seemed to be buzzing in my ears—*all is over!* And it was probable that he was right. In the state of prostration to which I was reduced, it was madness to think of ever again seeing the light of day.

Above were miles upon miles of the earth's crust. As I thought of it, I could fancy the whole weight resting on my shoulders. I was crushed, annihilated! and exhausted myself in vain attempts to turn in my granite bed.

Hours upon hours passed away. A profound and terrible silence reigned around us—a silence of the tomb. Nothing could make itself heard through these gigantic walls of granite. The very thought was stupendous.

Presently, despite my apathy, despite the kind of deadly calm into which I was cast, something aroused me. It was a slight but peculiar noise. While I was watching intently, I observed that the tunnel was becoming dark. Then gazing through the dim light that remained, I thought I saw the Iclander taking his departure, lamp in hand.

Why had he acted thus? Did Hans the guide mean to

abandon us? My uncle lay fast asleep—or dead. I tried to cry out, and arouse him. My voice, feebly issuing from my parched and fevered lips, found no echo in that fearful place. My throat was dry, my tongue stuck to the roof of my mouth. The obscurity had by this time become intense, and at last even the faint sound of the guide's footsteps was lost in the blank distance. My soul seemed filled with anguish, and death appeared welcome, only let it come quickly.

“Hans is leaving us,” I cried. “Hans—Hans, if you are a man, come back.”

These words were spoken to myself. They could not be heard aloud. Nevertheless, after the first few moments of terror were over, I was ashamed of my suspicions against a man, who hitherto had behaved so admirably. Nothing in his conduct or character justified suspicion. Moreover, a moment's reflection re-assured me. His departure could not be a flight. Instead of ascending the gallery, he was going deeper down into the gulf. Had he had any bad design, his way would have been upwards.

This reasoning calmed me a little and I began to hope!

The good, and peaceful, and imperturbable Hans would certainly not have arisen from his sleep without some serious and grave motive. Was he bent on a voyage of discovery? During the deep, still silence of the night had he at last heard that sweet murmur about which we were all so anxious?

CHAPTER XX.

WATER, WHERE IS IT? A BITTER DISAPPOINTMENT.

DURING a long, long, weary hour, there crossed my wildly delirious brain all sorts of reasons as to what could have aroused our quiet and faithful guide. The most absurd and ridiculous ideas passed through my head, each more impossible than the other. I believe I was either half or wholly mad.

Suddenly, however, there arose, as it were from the depths of the earth, a voice of comfort. It was the sound of footsteps! Hans was returning.

Presently the uncertain light began to shine upon the walls of the passage, and then it came in view far down the sloping tunnel. At length Hans himself appeared.

He approached my uncle, placed his hand upon his shoulder, and gently awakened him. My uncle, as soon as he saw who it was, instantly rose.

"Well!" exclaimed the Professor.

"*Vatten*," said the hunter.

I did not know a single word of the Danish language, and yet by a sort of mysterious instinct I understood what the guide had said.

"Water, water!" I cried, in a wild and frantic tone, clapping my hands, and gesticulating like a madman.

"Water!" murmured my uncle, in a voice of deep emotion and gratitude. "*Hvar?*" (where.)

"*Nedat*" (below.)

"Where? below!" I understood every word. I had caught the hunter by the hands, and I shook them heartily, while he looked on with perfect calmness.

The preparations for our departure did not take long, and we were soon making a rapid descent into the tunnel.

An hour later we had advanced a thousand yards, and descended two thousand feet.

At this moment I heard an accustomed and well-known sound running along the floors of the granite rock—a kind of dull and sullen roar, like that of a distant waterfall.

During the first half-hour of our advance, not finding the discovered spring, my feelings of intense suffering appeared to return. Once more I began to lose all hope. My uncle, however, observing how down-hearted I was again becoming, took up the conversation.

“Hans was right,” he exclaimed, enthusiastically; “that is the dull roaring of a torrent.”

“A torrent,” I cried, delighted at even hearing the welcome words.

“There’s not the slightest doubt about it,” he replied, “a subterranean river is flowing beside us.”

I made no reply, but hastened on, once more animated by hope. I began not even to feel the deep fatigue which hitherto had overpowered me. The very sound of this glorious murmuring water already refreshed me. We could hear it increasing in volume every moment. The torrent, which for a long time could be heard flowing over our heads, now ran distinctly along the left wall, roaring, rushing, spluttering, and still falling.

Several times I passed my hand across the rock hoping to find some trace of humidity—of the slightest percolation. Alas! in vain.

Again a half hour passed in the same weary toil. Again we advanced.

It now became evident that the hunter, during his absence, had not been able to carry his researches any farther. Guided by an instinct peculiar to the dwellers in mountain regions and water finders, he “smelt” the living

spring through the rock. Still he had not seen the precious liquid. He had neither quenched his own thirst, nor brought us one drop in his gourd.

Moreover, we soon made the disastrous discovery, that if our progress continued, we should soon be moving away from the torrent, the sound of which gradually diminished. We turned back. Hans halted at the precise spot where the sound of the torrent appeared nearest.

I could bear the suspense and suffering no longer, and seated myself against the wall, behind which I could hear the water seething and effervescing not two feet away. But a solid wall of granite still separated us from it!

Hans looked keenly at me, and, strange enough, for once I thought I saw a smile on his imperturbable face.

He rose from a stone on which he had been seated, and took up the lamp. I could not help rising and following. He moved slowly along the firm and solid granite wall. I watched him with mingled curiosity and eagerness. Presently he halted and placed his ear against the dry stone, moving slowly along and listening with the most extreme care and attention. I understood at once that he was searching for the exact spot where the torrent's roar was most plainly heard. This point he soon found in the lateral wall on the left side, about three feet above the level of the tunnel floor.

I was in a state of intense excitement. I scarcely dared believe what the eider-duck hunter was about to do. It was, however, impossible in a moment more not to both understand and applaud, and even to smother him in my embraces, when I saw him raise the heavy crowbar and commence an attack upon the rock itself.

"Saved," I cried.

"Yes," cried my uncle, even more excited and delighted than myself; "Hans is quite right. Oh, the worthy, excellent man! We should never have thought of such an idea."

And nobody else, I think, would have done so. Such a process, simple as it seemed, would most certainly not have entered our heads. Nothing could be more dangerous than to begin to work with pickaxes in that particular part of the globe. Supposing while he was at work a break-up were to take place, and supposing the torrent once having gained an inch were to take an ell, and come pouring bodily through the broken rock!

Not one of these dangers were chimerical. They were only too real. But at that moment no fear of falling in of roof, or even of inundation was capable of stopping us. Our thirst was so intense, that to quench it we would have dug below the bed of old Ocean itself.

Hans went quietly to work—a work which neither my uncle nor I would have undertaken at any price. Our impatience was so great, that if we had once begun with pickaxe and crowbar, the rock would soon have split into a hundred fragments. The guide, on the contrary, calm, ready, moderate, wore away the hard rock by little steady blows of his instrument, making no attempt at a larger hole than about six inches. As I stood, I heard, or I thought I heard, the roar of the torrent momentarily increasing in loudness, and at times I almost felt the pleasant sensation of water upon my parched lips.

At the end of what appeared an age, Hans had made a hole, which enabled his crowbar to enter two feet into the solid rock. He had been at work exactly an hour. It appeared a dozen. I was getting wild with impatience. My uncle began to think of using more violent measures. I had the greatest difficulty in checking him. He had indeed just got hold of his crowbar when a loud and welcome hiss was heard. Then a stream, or rather jet of water burst through the wall and came out with such force as to hit the opposite side!

Hans, the guide, who was half upset by the shock, was

scarcely able to keep down a cry of pain and grief. I understood his meaning when plunging my hands into the sparkling jet I myself gave a wild and frantic cry. The water was scalding hot!

"Boiling," I cried, in bitter disappointment.

"Well, never mind," said my uncle, "it will soon get cool."

The tunnel began to be filled by clouds of vapor, while a small stream ran away into the interior of the earth. In a short time we had some sufficiently cool to drink. We swallowed it in huge mouthfuls.

Oh what exalted delight—what rich and incomparable luxury! What was this water, whence did it come? To us what was that? The simple fact was—it was water; and, though still with a tinge of warmth about it, it brought back to the heart, that life which, but for it, must surely have faded away. I drank greedily, almost without tasting it.

When, however, I had almost quenched my ravenous thirst, I made a discovery.

"Why, it is ferruginous water."

"Most excellent stomachic," replied my uncle, "and highly mineralized. Here is a journey worth twenty to Spa."

"It's very good," I replied.

"I should think so. Water found six miles under ground. There is a peculiarly inky flavor about it, which is by no means disagreeable. Hans may congratulate himself on having made a rare discovery. What do you say, nephew, according to the usual custom of travellers, to name the stream after him?"

"Good," said I.

And the name of "Hans-bach" was at once agreed upon.

Hans was not a bit more proud after hearing our de-



THE BOILING JET.

termination than he was before. After having taken a very small modicum of the welcome refreshment, he had seated himself in a corner with his usual imperturbable gravity.

"Now," said I, "it is not worth while letting this water run to waste."

"What is the use," replied my uncle, "the source from which this river rises is inexhaustible."

"Never mind," I continued, "let us fill our goat skin and gourds, and then try to stop the opening up."

My advice, after some hesitation, was followed or attempted to be followed. Hans picked up all the broken pieces of granite he had knocked out, and using some tow he happened to have about him, tried to shut up the fissure he had made in the wall. All he did was to scald his hands. The pressure was too great, and all our attempts were utter failures.

"It is evident," I remarked, "that the upper surface of these springs is situated at a very great height above—as we may fairly infer from the great pressure of the jet."

"That is by no means doubtful," replied my uncle, "if this column of water is about thirty-two thousand feet high, the atmospheric pressure must be something enormous. But a new idea has just struck me."

"And what is that?"

"Why be at so much trouble to close this aperture?"

"Because——"

I hesitated and stammered, having no real reason.

"When our water bottles are empty, we are not at all sure that we shall be able to fill them," observed my uncle.

"I think that is very probable."

"Well, then, let this water run. It will, of course, naturally follow in our track, and will serve to guide and refresh us."

"I think the idea a good one," I cried, in reply, "and

with this rivulet as a companion, there is no further reason why we should not succeed in our marvellous project."

"Ah, my boy," said the professor, laughing, "after all, you are coming round."

"More than that, I am now confident of ultimate success. Forward."

"One moment, nephew mine. Let us begin by taking some hours of repose."

I had utterly forgotten that it was night. The chronometer, however, informed me of the fact. Soon we were sufficiently restored and refreshed, and had all fallen into a profound sleep.

CHAPTER XXI.

UNDER THE OCEAN.

By the next day we had nearly forgotten our past sufferings. The first sensation I experienced was surprise at not being thirsty, and I actually asked myself the reason. The running stream, which flowed in rippling wavelets at my feet, was the satisfactory reply.

We breakfasted with a good appetite, and then drank our fill of the excellent water. I felt myself quite a new man, ready to go anywhere my uncle chose to lead. I began to think. Why should not a man as seriously convinced as my uncle, succeed, with so excellent a guide as worthy Hans, and so devoted a nephew as myself? These were the brilliant ideas which now invaded my brain. Had the proposition now been made to go back to the summit of Mount Sneffels, I should have declined the offer in a most indignant manner.

But fortunately there was no question of going up. We were about to descend farther into the interior of the earth.

"Let us be moving," I cried, awakening the echoes of the old world.

We resumed our march on Thursday at eight o'clock in the morning. The great granite tunnel going round by sinuous and winding ways, presented every now and then sharp turns, and in fact had all the appearance of a labyrinth. Its direction, however, was in general towards the south-west. My uncle made several pauses in order to consult his compass.

The gallery now began to trend downwards in a horizontal direction, with about two inches of fall in every furlong. The murmuring stream flowed quietly at our

feet. I could not but compare it to some familiar spirit, guiding us through the earth, and I dabbled my fingers in its tepid water, which sang like a naiad as we progressed. My good humor began to assume a mythological character.

As for my uncle he began to complain of the horizontal character of the road. His route he found began to be indefinitely prolonged, instead of "sliding down the celestial ray," according to his expression.

But we had no choice; and as long as our road led towards the centre—however little progress we made, there was no reason to complain.

Moreover, from time to time the slopes were much greater; the naiad sang more loudly, and we began to dip downwards in earnest.

As yet, however, I felt no painful sensation. I had not got over the excitement of the discovery of water.

That day and the next we did a considerable amount of horizontal, and relatively very little vertical, travelling.

On Friday evening, the tenth of July, according to our estimation, we ought to have been thirty leagues to the southeast of Reykjavik, and about two leagues and a-half deep. We now received a rather startling surprise.

Under our feet there opened a horrible well. My uncle was so delighted that he actually clapped his hands—as he saw how steep and sharp was the descent.

"Ah, ah!" he cried, in rapturous delight; "this will take us a long way. Look at the projections of the rock. Hah!" he exclaimed, "it's a fearful staircase!"

Hans, however, who in all our troubles had never given up the ropes, took care so to dispose of them as to prevent any accidents. Our descent then began. I dare not call it a perilous descent, for I was already too familiar with that sort of work to look upon it as anything but a very ordinary affair.

This well was a kind of narrow opening in the massive granite of the kind known as a fissure. The contraction of the terrestrial scaffolding, when it suddenly cooled, had been evidently the cause. If it had ever served in former times as a kind of funnel through which passed the eruptive masses vomited by Sneffles, I was at a loss to explain how it had left no mark. We were, in fact, descending a spiral, something like those winding staircases in use in modern houses.

We were compelled every quarter of an hour or thereabouts to sit down in order to rest our legs. Our calves ached. We then seated ourselves on some projecting rock with our legs hanging over, and gossipped while we ate a mouthful—drinking still from the pleasantly-warm running stream which had not deserted us.

It is scarcely necessary to say, that in this curiously-shaped fissure the Hansbach had become a cascade to the detriment of its size. It was still however sufficient, and more, for our wants. Besides we knew that, as soon as the declivity ceased to be so abrupt, the stream must resume its peaceful course. At this moment it reminded me of my uncle, his impatience and rage, while when it flowed more peacefully, I pictured to myself the placidity of the Icelandic guide.

During the whole of two days, the sixth and seventh of July, we followed the extraordinary spiral staircase of the fissure, penetrating two leagues farther into the crust of the earth, which placed us five leagues below the level of the sea. On the eighth, however, at twelve o'clock in the day, the fissure suddenly assumed a much more gentle slope still trending in a south-east direction.

The road now became comparatively easy, and at the same time dreadfully monotonous. It would have been difficult for matters to have turned out otherwise. Our peculiar journey had no chance of being diversified by landscape and scenery. At all events, such was my idea.

At length, on Wednesday the fifteenth, we were actually seven leagues (twenty-one miles,) below the surface of the earth, and fifty leagues distant from the mountain of Sneffels. Though, if the truth be told, we were very tired, our health had resisted all suffering, and was in a most satisfactory state. Our traveller's box of medicaments had not even been opened.

My uncle was careful to note every hour the indications of the compass, of the manometer, and of the thermometer, all which he afterwards published in his elaborate philosophical and scientific account of our remarkable voyage. He was therefore able to give an exact relation of the situation. When, therefore, he informed me that we were fifty leagues in a horizontal direction distant from our starting-point, I could not suppress a loud exclamation.

"What is the matter now?" cried my uncle.

"Nothing very important, only an idea has entered my head," was my reply.

"Well, out with it, my boy."

"It is my opinion that if your calculations are correct we are no longer under Iceland."

"Do you think so?"

"We can very easily find out," I replied, pulling out the map and compasses.

"You see," I said, after careful measurement, "that I am not mistaken. We are far beyond Cape Portland; and those fifty leagues to the south-east will take us into the open sea."

"Under the open sea," cried my uncle, rubbing his hands with a delighted air.

"Yes," I cried, "no doubt old ocean flows over our heads."

"Well, my dear boy, what can be more natural. Do you not know that in the neighborhood of Newcastle there are coal mines which have been worked far out under the sea?"

Now my worthy uncle the Professor, no doubt regarded this discovery as a very simple fact, but to me the idea was by no means a pleasant one. And yet when one came to think the matter over seriously, what mattered it whether the plains and mountains of Iceland were suspended over our devoted heads, or the mighty billows of the Atlantic Ocean? The whole question rested on the solidity of the granite roof above us. However, I soon got used to the idea, for the passage now level, now running down, and still always to the south-east, kept going deeper and deeper into the profound abysses of Mother Earth.

Three days later, on the eighteenth day of July, on a Saturday, we reached a kind of vast grotto. My uncle here paid Hans his usual rix-dollars, and it was decided that the next day should be a day of rest.

CHAPTER XXII.

SUNDAY BELOW GROUND.

I AWOKE on Sunday morning without any sense of hurry and bustle attendant on an immediate departure. Though the day to be devoted to repose and reflection was spent under such strange circumstances, and in so wonderful a place, the idea was a pleasant one. Besides, we all began to get used to this kind of existence. I had almost ceased to think of the sun, of the moon, of the stars, of the trees, houses, and towns; in fact, about any terrestrial necessities. In our peculiar position we were far above such reflections.

The grotto was a vast and magnificent hall. Along its granitic soil the stream flowed placidly and pleasantly. So great a distance was it now from its fiery source, that its water was scarcely lukewarm, and could be drank without delay or difficulty.

After a frugal breakfast, the Professor made up his mind to devote some hours to putting his notes and calculations in order.

"In the first place," he said, "I have a good many to verify and prove, in order that we may know our exact position. I wish to be able on our return to the upper regions, to make a map of our journey, a kind of vertical section of the globe, which will be as it were the profile of the expedition."

"That would indeed be a curious work, uncle; but can you make your observations with anything like certainty and precision?"

"I can. I have never on one occasion failed to note

with great care the angles and slopes. I am certain as to having made no mistake. Take the compass and examine how she points."

I looked at the instrument with care.

"East one quarter south-east."

"Very good," resumed the Professor, noting the observation, and going through some rapid calculations. "I make out that we have journeyed two hundred and fifty miles from the point of our departure."

"Then the mighty waves of the Atlantic are rolling over our heads?"

"Certainly."

"And at this very moment it is possible that fierce tempests are raging above, and that men and ships are battling against the angry blasts just over our heads?"

"It is quite within the range of possibility," rejoined my uncle smiling.

"And that whales are playing in shoals, thrashing the bottom of the sea, the roof of our adamantine prison?"

"Be quite at rest on that point; there is no danger of their breaking through. But to return to our calculations. We are to the south-east, two hundred and fifty miles from the base of Sneffels, and, according to my preceding notes, I think we have gone sixteen leagues in a downward direction."

"Sixteen leagues—fifty miles!" I cried.

"I am sure of it."

"But that is the extreme limit allowed by science for the thickness of the earth's crust," I replied, referring to my geological studies.

"I do not contravene that assertion," was his quiet answer.

"And at this stage of our journey, according to all known laws on the increase of heat, there should be here a temperature of *fifteen hundred* degrees of Reaumur."

"There should be—you say, my boy."

"In which case this granite would not exist, but be in a state of fusion."

"But you perceive, my boy, that it is not so, and that facts, as usual, are very stubborn things, overruling all theories."

"I am forced to yield to the evidence of my senses, but I am nevertheless very much surprised."

"What heat does the thermometer really indicate?" continued the philosopher.

"Twenty-seven six-tenths."

"So that science is wrong by fourteen hundred and seventy-four degrees and four-tenths. According to which, it is demonstrated that the proportional increase in temperature is an exploded error. Humphrey Davy here shines forth in all his glory. He is right, and I have acted wisely to believe him. Have you any answer to make to this statement?"

Had I chosen to have spoken, I might have said a great deal. I in no way admitted the theory of Humphrey Davy—I still held out for the theory of proportional increase of heat, though I did not feel it.

I was far more willing to allow that this chimney of an extinct volcano was covered by lava of a kind refractory to heat—in fact a bad conductor—which did not allow the great increase of temperature to percolate through its sides. The hot water jet supported my view of the matter.

But without entering on a long and useless discussion, or seeking for new arguments to controvert my uncle, I contented myself with taking up facts as they were.

"Well, sir, I take for granted that all your calculations are correct, but allow me to draw from them a rigorous and definite conclusion."

"Go on, my boy—have your say," cried my uncle, good-humoredly.

"At the place where we now are, under the latitude of Iceland, the terrestrial depth is about fifteen hundred and eighty-three leagues."

"Fifteen hundred, eighty-three and a quarter."

"Well, suppose we say sixteen hundred in round numbers. Now, out of a voyage of sixteen hundred leagues we have completed sixteen."

"As you say, what then?"

"At the expense of a diagonal journey of no less than eighty-five leagues."

"Exactly."

"We have been twenty days about it."

"Exactly twenty days."

"Now sixteen is the hundredth part of our contemplated expedition. If we go on in this way we shall be two thousand days, that is about five years and a half, going down."

The professor folded his arms, listened, but did not speak.

"Without counting that if a vertical descent of sixteen leagues costs us a horizontal of eighty-five, we shall have to go about eight thousand leagues to the south-east, and we must therefore come out somewhere in the circumference long before we can hope to reach the centre."

"Bother your calculations," cried my uncle in one of his old rages. "On what basis do they rest? How do you know that this passage does not takes us direct to the end we require? Moreover, I have in my favor, fortunately, a precedent. What I have undertaken to do, another has done, and he having succeeded, why should I not be equally successful?"

"I hope, indeed, you will, but still, I suppose I may be allowed to——"

"You are allowed to hold your tongue," cried Professor Hardwigg, "when you talk so unreasonably as this."

I saw at once that the old doctorial Professor was still alive in my uncle—and fearful to rouse his angry passions, I dropped the unpleasant subject.

“Now, then,” he explained, “consult the manometer. What does that indicate?”

“A considerable amount of pressure.”

“Very good. You see, then, that by descending slowly, and by gradually accustoming ourselves to the density of this lower atmosphere, we shall not suffer.

“Well, I suppose not, except it may be a certain amount of pain in the ears,” was my rather grim reply.

“That, my dear boy, is nothing, and you will easily get rid of that source of discomfort by bringing the exterior air in communication with the air contained in your lungs.”

“Perfectly,” said I, for I had quite made up my mind in no wise to contradict my uncle. “I should fancy almost that I should experience a certain amount of satisfaction in making a plunge into this dense atmosphere. Have you taken note of how wonderfully sound is propagated?”

“Of course I have. There can be no doubt that a journey into the interior of the earth would be an excellent cure for deafness.”

“But then, uncle,” I ventured mildly to observe, “this density will continue to increase.”

“Yes—according to a law which, however, is scarcely defined. It is true that the intensity of weight will diminish just in proportion to the depth to which we go. You know very well that it is on the surface of the earth that its action is most powerfully felt, while on the contrary, in the very centre of the earth bodies cease to have any weight at all.”

“I know that is the case, but as we progress will not the atmosphere finally assume the density of water?”

"I know it; when placed under the pressure of seven hundred and ten atmospheres," cried my uncle with imperturbable gravity.

"And when we are still lower down?" I asked with natural anxiety.

"Well, lower down, the density will become even greater still."

"Then how shall we be able to make our way through this atmospheric fog?"

"Well, my worthy nephew, we must ballast ourselves by filling our pockets with stones," said Professor Hardwigg.

"Faith, uncle, you have an answer for everything," was my only reply.

I began to feel that it was unwise in me to go any farther into the wide field of hypotheses for I should certainly have revived some difficulty, or rather impossibility that would have enraged the Professor.

It was evident, nevertheless, that the air under a pressure which might be multiplied by thousands of atmospheres, would end by becoming perfectly solid, and that then admitting our bodies resisted the pressure, we should have to stop, in spite of all the reasonings in the world. Facts overcome all arguments.

But I thought it best not to urge this argument. My uncle would simply have quoted the example of Saknussemm. Supposing the learned Icelandic's journey ever really to have taken place—there was one simple answer to be made:—

In the sixteenth century neither the barometer nor the manometer had been invented—how, then, could Saknussemm have been able to discover when he did reach the centre of the earth?

This unanswerable and learned objection I, however, kept to myself, and bracing up my courage awaited the

course of events—little aware of how adventurous yet were to be the incidents of our remarkable journey.

The rest of this day of leisure and repose was spent in calculation and conversation. I made it a point to agree with the Professor in everything; but I envied the perfect indifference of Hans, who without taking any such trouble about the cause and effect, went blindly onwards wherever destiny chose to lead them.

CHAPTER XXIII.

ALONE.

IT must in all truth be confessed, things as yet had gone on well, and I should have acted in bad taste to have complained. If the true medium of our difficulties did not increase, it was within the range of possibility that we might ultimately reach the end of our journey. Then what glory would be ours! I began in the newly-aroused ardor of my soul to speak enthusiastically to the Professor. Well, was I serious? The whole state in which we existed was a mystery—and it was impossible to know whether or not I was in earnest.

For several days after our memorable halt, the slopes became more rapid—some were even of a most frightful character—almost vertical, so that we were for ever going down into the solid interior mass. During some days, we actually descended a league and a-half, even two leagues towards the centre of the earth. The descents were sufficiently perilous, and while we were engaged in them we learned fully to appreciate the marvellous coolness of our guide Hans. Without him we should have been wholly lost. The grave and impassible Iclander devoted himself to us with the most incomprehensible *sang froid* and ease; and, thanks to him, many a dangerous pass was got over, where, but for him, we should inevitably have stuck fast.

His silence increased every day. I think that we began to be influenced by this peculiar trait in his character. It is certain that the inanimate objects by which you are surrounded have a direct action on the brain. It must be

that a man who shuts himself up between four walls must lose the faculty of associating ideas and words. How many persons condemned to the horrors of solitary confinement have gone mad—simply because the thinking faculties have lain dormant!

During the two weeks that followed our last interesting conversation, there occurred nothing worthy of being especially recorded.

I have, while writing these memoirs, taxed my memory in vain for one incident of travel during this particular period.

But the next event to be related is terrible indeed. Its very memory, even now, makes my soul shudder, and my blood run cold.

It was on the seventh of August. Our constant and successive descents had taken us quite thirty leagues into the interior of the earth, that is to say that there were above us thirty leagues, nearly a hundred miles, of rocks, and oceans, and continents, and towns, to say nothing of living inhabitants. We were in a south-easterly direction, about two hundred leagues from Iceland.

On that memorable day the tunnel had begun to assume an almost horizontal course.

I was on this occasion walking on in front. My uncle had charge of one of the Ruhmkorf coils, I had possession of the other. By means of its light I was busy examining the different layers of granite. I was completely absorbed in my work.

Suddenly halting and turning round, I found that I was alone!

“Well,” thought I to myself, “I have certainly been walking too fast—or else Hans and my uncle have stopped to rest. The best thing I can do is to go back and find them. Luckily, there is very little ascent to tire me.”

I accordingly retraced my steps, and while doing so,

walked for at least a quarter of an hour. Rather uneasy, I paused and looked eagerly around. Not a living soul. I called aloud. No reply. My voice was lost amid the myriad cavernous echoes it aroused!

I began for the first time to feel seriously uneasy. A cold shiver shook my whole body, and perspiration, chill and terrible, burst upon my skin.

"I must be calm," I said, speaking aloud, as boys whistle to drive away fear. "There can be no doubt that I shall find my companions. There cannot be two roads. It is certain that I was considerably ahead; all I have to do is to go back."

Having come to this determination I ascended the tunnel for at least half an hour, unable to decide if I had ever seen certain landmarks before. Every now and then I paused to discover if any loud appeal was made to me, well knowing that in that dense and intensified atmosphere I should hear it a long way off. But no. The most extraordinary silence reigned in this immense gallery. Only the echoes of my own footsteps could be heard.

At last I stopped. I could scarcely realize the fact of my isolation. I was quite willing to think that I had made a mistake, but not that I was lost. If I had made a mistake, I might find my way: if lost—I shuddered to think of it.

"Come, come," said I to myself, "since there is only one road, and they must come by it, we shall at last meet. All I have to do is still to go upwards. Perhaps, however, not seeing me, and forgetting I was ahead, they may have gone back in search of me. Still even in this case, if I make haste, I shall get up to them. There can be no doubt about the matter."

But as I spoke these last words aloud, it would have been quite clear to any listener—had there been one—that I was by no means convinced of the fact. Moreover, in

order to associate together these simple ideas and to reunite them under the form of reasoning, required some time. I could not all at once bring my brain to think.

Then another dread doubt fell upon my soul. After all, was I ahead. Of course I was. Hans was no doubt following behind preceded by my uncle. I perfectly recollected his having stopped for a moment to strap his baggage on his shoulder. I now remembered this trifling detail. It was, I believed, just at that very moment that I had determined to continue my route.

"Again," thought I, reasoning as calmly as was possible, "there is another sure means of not losing my way, a thread to guide me through the labyrinthine subterraneous retreat—one which I had forgotten—my faithful river."

This course of reasoning roused my drooping spirits, and I resolved to resume my journey without further delay. No time was to be lost.

It was at this moment that I had reason to bless the thoughtfulness of my uncle, when he refused to allow the eider hunter to close the orifices of the hot spring—that small fissure in the great mass of granite. This beneficent spring after having saved us from thirst during so many days would now enable me to regain the right road.

Having come to this mental decision, I made up my mind, before I started upwards, that ablution would certainly do me a great deal of good.

I stopped to plunge my hands and forehead in the pleasant water of the Hansbach stream, blessing its presence as a certain consolation.

Conceive my horror and stupefaction!—I was treading a hard, dusty, shingly road of granite. The stream on which I reckoned had wholly disappeared!

CHAPTER XXIV.

LOST!

No words in any human language can depict my utter despair. I was literally buried alive; with no other expectation before me but to die in all the slow horrible torture of hunger and thirst.

Mechanically I crawled about, feeling the dry and arid rock. Never to my fancy had I ever felt anything so dry.

But, I frantically asked myself, how had I lost the course of the flowing stream? There could be no doubt it had ceased to flow in the gallery in which I now was. Now I began to understand the cause of the strange silence which prevailed when last I tried if any appeal from my companions might perchance reach my ear.

It so happened that when I first took an imprudent step in the wrong direction, I did not perceive the absence of the all-important stream.

It was now quite evident that when we halted, another tunnel must have received the waters of the little torrent, and that I had unconsciously entered a different gallery. To what unknown depths had my companions gone? Where was I?

How to get back! Clue or landmark there was absolutely none! My feet left no signs on the granite and shingle. My brain throbbed with agony as I tried to discover the solution of this terrible problem. My situation, after all sophistry and reflection, had finally to be summed up in three awful words—

Lost! LOST!! LOST!!!

Lost at a depth which, to my finite understanding, appeared to be immeasurable.

These thirty leagues of the crust of the earth weighed upon my shoulders like the globe on the shoulders of Atlas. I felt myself crushed by the awful weight. It was indeed a position to drive the sanest man to madness!

I tried to bring my thoughts back to the things of the world so long forgotten. It was with the greatest difficulty that I succeeded in doing so. Hamburg, the house on the Königstrasse, my dear cousin Gretchen—all that world which had before vanished like a shadow floated before my now vivid imagination.

There they were before me, but how unreal. Under the influence of a terrible hallucination I saw the whole incidents of our journey pass before me like the scenes of a panorama. The ship and its inmates, Iceland, M. Fridriksson, and the great summit of Mount Sneffels! I said to myself that if in my position, I retained the most faint and shadowy outline of a hope it would be a sure sign of approaching delirium. It were better to give way wholly to despair!

In fact, did I but reason with calmness and philosophy, what human power was there in existence able to take me back to the surface of the earth, and ready too, to split asunder, to rend in twain, those huge and mighty vaults which stand above my head? Who could enable me to find my road—and regain my companions?

Insensate folly and madness to entertain even a shadow of hope!

“Oh, uncle!” was my despairing cry.

This was the only word of reproach which came to my lips; for I thoroughly understood how deeply and sorrowfully the worthy Professor would regret my loss, and how in his turn he would patiently seek for me.

When I at last began to resign myself to the fact that no further aid was to be expected from man, and knowing that I was utterly powerless to do anything for my own

salvation, I kneeled with earnest fervor and asked assistance from Heaven. The remembrance of my innocent childhood, the memory of my mother, known only in my infancy, came welling forth from my heart. I had recourse to prayer. And little as I had right to be remembered by Him whom I had forgotten in the hour of prosperity, and whom I so tardily invoked, I prayed earnestly and sincerely.

This renewal of my youthful faith brought about a much greater amount of calm, and I was enabled to concentrate all my strength and intelligence on the terrible realities of my unprecedented situation.

I had about me that which I had at first wholly forgotten—three days' provisions. Moreover, my water bottle was quite full. Nevertheless, the one thing which it was impossible to do was to remain alone. Try to find my companions I must, at any price. But which course should I take? Should I go upwards, or again descend? Doubtless it was right to retrace my steps in an upward direction.

By doing this with care and coolness, I must reach the point where I had turned away from the rippling stream. I must find the fatal bifurcation or fork. Once at this spot, once the river at my feet, I could, at all events, regain the awful crater of Mount Sneffels. Why had I not thought of this before? This, at last, was a reasonable hope of safety. The most important thing, then, to be done was to discover the bed of the Hansbach.

After a slight meal and a draught of water, I rose like a giant refreshed. Leaning heavily on my pole, I began the ascent of the gallery. The slope was very rapid and rather difficult. But I advanced hopefully and carefully, like a man who at last is making his way out of a forest, and knows there is only one road to follow.

During one whole hour nothing happened to check my progress. As I advanced I tried to recollect the shape of

the tunnel—to recall to my memory certain projections of rocks—to persuade myself that I had followed certain winding routes before. But no one particular sign could I bring to mind, and I was soon forced to allow that this gallery would never take me back to the point at which I had separated myself from my companions. It was absolutely without issue—a mere blind alley in the earth.

The moment at length came when, facing the solid rock, I knew my fate, and fell inanimate on the arid floor!

To describe the horrible state of despair and fear into which I then fell would now be vain and impossible. My last hope, the courage which had sustained me, drooped before the sight of this pitiless granite rock!

Lost in a vast labyrinth, the sinuosities of which spread in every direction, without guide, clue or compass, it was a vain and useless task to attempt flight. All that remained to me was to lie down and die. To lie down and die the most cruel and horrible of deaths!

In my state of mind, the idea came into my head that one day perhaps, when my fossil bones were found, their discovery so far below the level of the earth might give rise to solemn and interesting scientific discussions.

I tried to cry aloud, but hoarse, hollow and inarticulate sounds alone could make themselves heard through my parched lips. I literally panted for breath.

In the midst of all these horrible sources of anguish and despair, a new horror took possession of my soul. My lamp, by falling down, had got out of order. I had no means of repairing it. Its light was already becoming paler and paler, and soon would expire.

With a strange sense of resignation and despair, I watched the luminous current in the coil getting less and less. A procession of shadows moved flashing along the granite wall. I scarcely dared to lower my eyelids, fearing to lose the last spark of this fugitive light. Every in-

stant it seemed to me that it was about to vanish and to leave me for ever—in utter darkness!

At last, one final trembling flame remained in the lamp; I followed it with all my power of vision; I gasped for breath; I concentrated upon it all the power of my soul, as upon the last scintillation of light I was ever destined to see: and then I was to be lost for ever in Cimmerian and tenebrous shades.

A wild and plaintive cry escaped my lips. On earth during the most profound and comparatively complete darkness, light never allows a complete destruction and extinction of its power. Light is so diffuse, so subtle, that it permeates everywhere, and whatever little may remain, the retina of the eye will succeed in finding it. In this place nothing—not the faintest ray of light. It mazed me!

My head was now wholly lost. I raised my arms, trying the effects of the feeling in getting against the cold stone wall. It was painful in the extreme. Madness must have taken possession of me. I knew not what I did. I began to run, to fly, rushing at haphazard in this inextricable labyrinth, always going downwards, running wildly underneath the terrestrial crust, like an inhabitant of the subterranean furnaces, screaming, roaring, howling, until bruised by the pointed rocks, falling and picking myself up all covered with blood, seeking madly to drink the blood which dripped from my torn features, mad because this blood only trickled over my face, and watching always for this horrid wall which ever presented to me the fearful obstacle against which I could not dash my head.

Where was I going? It was impossible to say. I was perfectly ignorant of the matter.

Several hours passed in this way. After a long time, having utterly exhausted my strength, I fell a heavy inert mass along the side of the tunnel, and lost all consciousness of existence!

CHAPTER XXV.

THE WHISPERING GALLERY.

WHEN at last I came back to a sense of life and being, my face was wet; but wet as I soon knew with tears. How long this state of insensibility lasted, it is quite impossible for me now to say. I had no means left to me of taking any account of time. Never since the creation of the world, had such a solitude as mine existed. I was completely abandoned.

After my fall I lost much blood. I felt myself flooded with the life-giving liquid. My first sensation was perhaps a natural one. Why was I not dead? Because I was alive, there was something left to do. I tried to make up my mind to think no longer. As far as I was able, I drove away all ideas, and utterly overcome by pain and grief, I crouched against the granite wall.

I just commenced to feel the fainting coming on again, and the sensation that this was the last struggle before complete annihilation,—when, on a sudden, a violent uproar reached my ears. It had some resemblance to the prolonged rumbling voice of thunder, and I clearly distinguished sonorous voices, lost one after the other, in the distant depths of the gulf.

Whence came this noise? Naturally, it was to be supposed from new phenomena which were taking place in the bosom of the solid mass of Mother Earth! The explosion of some gaseous vapors, or the fall of some solid, of the granitic or other rock.

Again I listened with deep attention. I was extremely anxious to hear if this strange and inexplicable sound was likely to be renewed! A whole quarter of an hour elapsed



THE WHISPER HEARD.

in painful expectation. Deep and solemn silence reigned in the tunnel. So still that I could hear the beatings of my own heart! I waited, waited, waited with a strange kind of hopefulness.

Suddenly my ear, which leant accidentally against the wall, appeared to catch as it were the faintest echo of a sound. I thought that I heard vague, incoherent and distant voices. I quivered all over with excitement and hope!

"It must be hallucination," I cried. "It cannot be! it is not true!"

But no! By listening more attentively, I really did convince myself that what I heard was truly the sound of human voices. To make any meaning out of the sound, however, was beyond my power. I was too weak even to hear distinctly. Still it was a positive fact that some one was speaking. Of that I was quite certain.

There was a moment of fear. A dread fell upon my soul that it might be my own words brought back to me by a distant echo. Perhaps without knowing it, I might have been crying aloud. I resolutely closed my lips, and once more placed my ear to the huge granite wall.

Yes, for certain. It was in truth the sound of human voices.

I now by the exercise of great determination dragged myself along the sides of the cavern, until I reached a point where I could hear more distinctly. But though I could detect the sound, I could only make out uncertain, strange, and incomprehensible words. They reached my ear as if they had been spoken in a low tone—murmured, as it were, afar off.

At last, I made out the word *förlorad* repeated several times in a tone betokening great mental anguish and sorrow.

What could this word mean, and who was speaking it? It must be either my uncle or the guide Hans! If, there-

fore, I could hear them, they must surely be able to hear me.

“Help,” I cried at the top of my voice; “help, I am dying!”

I then listened with scarcely a breath; I panted for the slightest sound in the darkness—a cry, a sigh, a question! But silence reigned supreme. No answer came! In this way some minutes passed. A whole flood of ideas flashed through my mind. I began to fear that my voice weakened by sickness and suffering could not reach my companions who were in search of me.

“It must be them,” I cried; “what other men can by possibility be buried a hundred miles below the level of the earth?” The mere supposition was preposterous.

I began, therefore, to listen again with the most breathless attention. As I moved my ears along the side of the place I was in, I found a mathematical point as it were, where the voices appeared to attain their maximum of intensity. The word *förlorad* again distinctly reached my ear. Then came again that rolling noise like thunder which had awakened me out of torpor.

“I begin to understand,” I said to myself after some little time devoted to reflection; “it is not through the solid mass that the sound reaches my ears. The walls of my cavernous retreat are of solid granite, and the most fearful explosion would not make uproar enough to penetrate them. The sound must come along the gallery itself. The place I was in must possess some peculiar acoustic properties of its own.”

Again I listened; and this time—yes, this time—I heard my name distinctly pronounced: cast as it were into space.

It was my uncle the Professor who was speaking. He was in conversation with the guide, and the word which had so often reached my ears, *förlorad*, was a Danish expression.

Then I understood it all. In order to make myself heard, I too must speak as it were along the side of the gallery, which would carry the sound of my voice just as the wire carries the electric fluid from point to point.

But there was no time to lose. If my companions were only to remove a few feet from where they stood, the acoustic effect would be over, my Whispering Gallery would be destroyed. I again therefore crawled towards the wall, and said as clearly and distinctly as I could—

“Uncle Hardwigg.”

I then awaited a reply.

Sound does not possess the property of travelling with such extreme rapidity. Besides the density of the air at that depth from light and motion, was very far from adding to the rapidity of circulation. Several seconds elapsed, which to my excited imagination, appeared ages; and these words reached my eager ears, and moved my wildly beating heart—

“Harry, my boy, is that you?”

A short delay between question and answer.

“Yes—yes.”

“Where are you?”

“Lost!”

“And your lamp?”

“Out.”

“But the guiding stream?”

“Is lost!”

“Keep your courage, Harry. We will do our best.”

“One moment, my uncle,” I cried; “I have no longer strength to answer your questions. But—for heaven’s sake—do you—continue—to speak—to me!”

Absolute silence I felt, would be annihilation.

“Keep up your courage,” said my uncle. “As you are so weak do not speak. We have been searching for you in all directions, both by going upwards and downwards

in the gallery. My dear boy, I had begun to give over all hope—and you can never know what bitter tears of sorrow and regret I have shed. At last, supposing you to be still on the road beside the Hansbach we again descended, firing off guns as signals. Now, however, that we have found you, and that our voices reach each other, it may be a long time before we actually meet. We are conversing by means of some extraordinary acoustic arrangement of the labyrinth. But do not despair, my dear boy. It is something gained even to hear each other.”

While he was speaking my brain was at work reflecting. A certain undefined hope, vague and shapeless as yet, made my heart beat wildly. In the first place, it was absolutely necessary for me to know one thing. I once more therefore leaned my head against the wall, which I almost touched with my lips, and again spoke.

“Uncle.”

“My boy,” was his ready answer.

“It is of the utmost consequence that we should know how far we are asunder.”

“That is not difficult.”

“You have your chronometer at hand?” I asked.

“Certainly.”

“Well, take it into your hand. Pronounce my name, noting exactly the second at which you speak. I will reply as soon as I hear your words—and you will then note exactly the moment at which my reply reaches you.”

“Very good; and the mean time between my question and your answer will be the time occupied by my voice in reaching you.”

“That is exactly what I mean, uncle,” was my eager reply.

“Are you ready?”

“Yes.”

“Well, make ready, I am about to pronounce your name,” said the Professor.

I applied my ear close to the sides of the cavernous gallery, and as soon as the word Harry reached my ear, I turned round, and placing my lips to the wall, repeated the sound.

"Forty seconds," said my uncle. "There has elapsed forty seconds between the two words. The sound, therefore, takes twenty seconds to ascend. Now, allowing a thousand and twenty feet for every second—we have twenty thousand four hundred feet—a league and a half and one-eighth."

These words fell on my soul like a kind of death-knell.

"A league and a-half," I muttered in a low and despairing voice.

"It shall be got over, my boy," cried my uncle in a cheery tone; "depend on us."

"But do you know whether to ascend or descend?" I asked faintly enough.

"We have to descend, and I will tell you why. You have reached a vast open space, a kind of bare cross road, from which galleries diverge in every direction. That in which you are now lying, must necessarily bring you to this point, for it appears that all these mighty fissures, these fractures of the globe's interior radiate from the vast cavern which we at this moment occupy. Rouse yourself, then, have courage and continue your route. Walk if you can, if not drag yourself along—slide, if nothing else is possible. The slope must be rather rapid—and you will find strong arms to receive you at the end of your journey. Make a start, like a good fellow."

These words served to rouse some kind of courage in my sinking frame.

"Farewell for the present, good uncle, I am about to take my departure. As soon as I start, our voices will cease to commingle. Farewell, then, until we meet again."

“Adieu, Harry—until we say Welcome.” Such were the last words which reached my anxious ears, before I commenced my weary and almost hopeless journey.

This wonderful and surprising conversation which took place through the vast mass of the earth’s labyrinth, these words exchanged, the speakers being about five miles apart—ended with hopeful and pleasant expressions. I breathed one more prayer to Heaven, I sent up words of thanksgiving—believing in my inmost heart that He had led me to the only place where the voices of my friends could reach my ears.

This apparently astounding acoustic mystery is easily explainable by simple natural laws; it arose from the conductivity of the rock. There are many instances of this singular propagation of sound which are not perceptible in its less mediate positions. In the interior gallery of St. Paul’s, and amid the curious caverns in Sicily, these phenomena are observable. The most marvellous of them all is known as the Ear of Dionysius.

These memories of the past, of my early reading and studies, came fresh to my thoughts. Moreover, I began to reason that if my uncle and I could communicate at so great a distance, no serious obstacle could exist between us. All I had to do was to follow the direction whence the sound had reached me; and, logically putting it, I must reach him if my strength did not fail.

I accordingly rose to my feet. I soon found, however, that I could not walk; that I must drag myself along. The slope as I expected, was very rapid; but I allowed myself to slip down.

Soon the rapidity of the descent began to assume frightful proportions; and menaced a fearful fall. I clutched at the sides; I grasped at projections of rocks; I threw myself backwards. All in vain. My weakness was so great I could do nothing to save myself.

Suddenly earth failed me.

I was first launched into a dark, and gloomy void. I then struck against the projecting asperities of a vertical gallery, a perfect well. My head bounded against a pointed rock, and I lost all knowledge of existence. As far as I was concerned, death had claimed me for his own.

CHAPTER XXVI.

A RAPID RECOVERY.

WHEN I returned to the consciousness of existence, I found myself surrounded by a kind of semi-obscurity, lying on some thick and soft coverlids. My uncle was watching—his eyes fixed intently on my countenance, a grave expression on his face; a tear in his eye. At the first sigh which struggled from my bosom he took hold of my hand. When he saw my eyes open and fix themselves upon his, he uttered a loud cry of joy.

“He lives! he lives!”

“Yes, my good uncle,” I whispered.

“My dear boy,” continued the grim Professor, clasping me to his heart, “you are saved!”

I was deeply and unaffectedly touched by the tone in which these words were uttered, and even more by the kindly care which accompanied them. The Professor, however, was one of those men who must be severely tried in order to induce any display of affection or gentle emotion. At this moment our friend Hans, the guide, joined us. He saw my hand in that of my uncle, and I venture to say that, taciturn as he was, his eyes beamed with lively satisfaction.

“*God dag,*” he said.

“Good day, Hans, good day,” I replied, in as hearty a tone as I could assume, “and now, uncle, that we are together, tell me where we are. I have lost all idea of our position, as of everything else.”

“To-morrow, Harry, to-morrow,” he replied. “To-day you are far too weak. Your head is surrounded with bandages and poultices that must not be touched. Sleep,

my boy, sleep, and to-morrow you will know all that you require."

"But," I cried, "let me know what o'clock it is—what day it is?"

"It is now eleven o'clock at night, and this is once more Sunday. It is now the ninth of the month of August. And I distinctly prohibit you from asking any more questions until the tenth of the same."

I was, if the truth were told, very weak indeed, and my eyes soon closed involuntarily. I did require a good night's rest, and I went off reflecting at the last moment that my perilous adventure in the interior of the earth, in total darkness, had lasted four days!

On the morning of the next day, at my awakening, I began to look around me. My sleeping-place, made of all our travelling bedding, was in a charming grotto, adorned with magnificent stalagmites, glittering in all the colors of the rainbow, the floor of soft and silvery sand.

A dim obscurity prevailed. No torch, no lamp was lighted, and yet certain unexplained beams of light penetrated from without, and made their way through the opening of the beautiful grotto.

I, moreover, heard a vague and indefinite murmur, like the ebb and flow of waves upon a strand, and sometimes I verily believed I could hear the sighing of the wind.

I began to believe that, instead of being awake, I must be dreaming. Surely my brain had not been affected by my fall, and all that occurred during the last twenty-four hours was not the frenzied visions of madness? And yet after some reflection, a trial of my faculties, I came to the conclusion that I could not be mistaken. Eyes and ears could not surely both deceive me.

"It is a ray of the blessed daylight," I said to myself, "which has penetrated through some mighty fissure in the rocks. But what is the meaning of this murmur of waves,

this unmistakable moaning of the salt sea billows? I can hear, too, plainly enough, the whistling of the wind. But can I be altogether mistaken? If my uncle, during my illness, has but carried me back to the surface of the earth! Has he, on my account, given up his wondrous expedition, or in some strange manner has it come to an end?"

I was puzzling my brain over these and other questions, when the Professor joined me.

"Good-day, Harry," he cried in a joyous tone. "I fancy you are quite well."

"I am very much better," I replied, actually sitting up in my bed.

"I knew that would be the end of it, as you slept both soundly and tranquilly. Hans and I have each taken turn to watch, and every hour we have seen visible signs of amelioration."

"You must be right, uncle," was my reply, "for I feel as if I could do justice to any meal you could put before me. I am really hungry."

"You shall eat, my boy, you shall eat. The fever has left you. Our excellent friend Hans has rubbed your wounds and bruises, with I know not what ointment, of which the Icelanders alone possess the secret. And they have healed your bruises in the most marvellous manner. Ah, he's a wise fellow, is Master Hans."

While he was speaking, my uncle was placing before me several articles of food, which despite his earnest injunctions, I readily devoured. As soon as the first rage of hunger was appeased, I overwhelmed him with questions, to which he now no longer hesitated to give answers.

I then learned, for the first time, that my providential fall had brought me to the bottom of an almost perpendicular gallery. As I came down, amidst a perfect shower of stones, the least of which falling on me would have

crushed me to death, they came to the conclusion that I had carried with me an entire dislocated rock. Riding as it were on this terrible chariot, I was cast headlong into my uncle's arms. And into them I fell, insensible and covered with blood.

"It is indeed a miracle," was the Professor's final remark, "that you were not killed a thousand times over. But let us take care never to separate; for surely we should risk never meeting again."

"Let us take care never again to separate."

These words fell with a sort of chill upon my heart. The journey, then, was not over. I looked at my uncle with surprise and astonishment. My uncle, after an instant's examination of my countenance, said—

"What is the matter, Harry?"

"I want to ask you a very serious question. You say that I am all right in health?"

"Certainly you are."

"And all my limbs are sound and capable of new exertion?" I asked.

"Most undoubtedly."

"But what about my head?" was my next anxious question.

"Well, your head, except that you have one or two contusions, is exactly where it ought to be—on your shoulder," said my uncle, laughing.

"Well, my own opinion is that my head is not exactly right. In fact, I believe myself slightly delirious."

"What makes you think so?"

"I will explain why I fancy I have lost my senses," I cried; "have we not returned to the surface of mother earth?"

"Certainly not."

"Then truly I must be mad, for do I not see the light of day? do I not hear the whistling of the wind? and can I not distinguish the wash of a great sea?"

“And that is all that makes you uneasy?” said my uncle, with a smile.

“Can you explain?”

“I will not make any attempt to explain; for the whole matter is utterly inexplicable. But you shall see and judge for yourself. You will then find that geological science is as yet in its infancy—and that we are doomed to enlighten the world.”

“Let us advance, then,” I cried eagerly, no longer able to restrain my curiosity.

“Wait a moment, my dear Harry,” he responded; “you must take precautions after your illness before going into the open air.”

“The open air?”

“Yes, my boy. I have to warn you that the wind is rather violent—and I have no wish for you to expose yourself without necessary precautions.”

“But I beg to assure you that I am perfectly recovered from my illness.”

“Have just a little patience, my boy. A relapse would be inconvenient to all parties. We have no time to lose—as our approaching sea voyage may be of long duration.”

“Sea voyage?” I cried, more bewildered than ever.

“Yes. You must take another day’s rest, and we shall be ready to go on board by to-morrow,” replied my uncle, with a peculiar smile.

Go on board! The words utterly astonished me.

Go on board—what and how? Had we come upon a river, a lake, had we discovered some inland sea? Was a vessel lying at anchor in some part of the interior of the earth?

My curiosity was worked up to the very highest pitch. My uncle made vain attempts to restrain me. When at last, however, he discovered that my feverish impatience would do more harm than good—and that the satisfaction

of my wishes could alone restore me to a calm state of mind, he gave way.

I dressed myself rapidly—and then taking the precaution to please my uncle, of wrapping myself in one of the coverlets, I rushed out of the grotto.

CHAPTER XXVII.

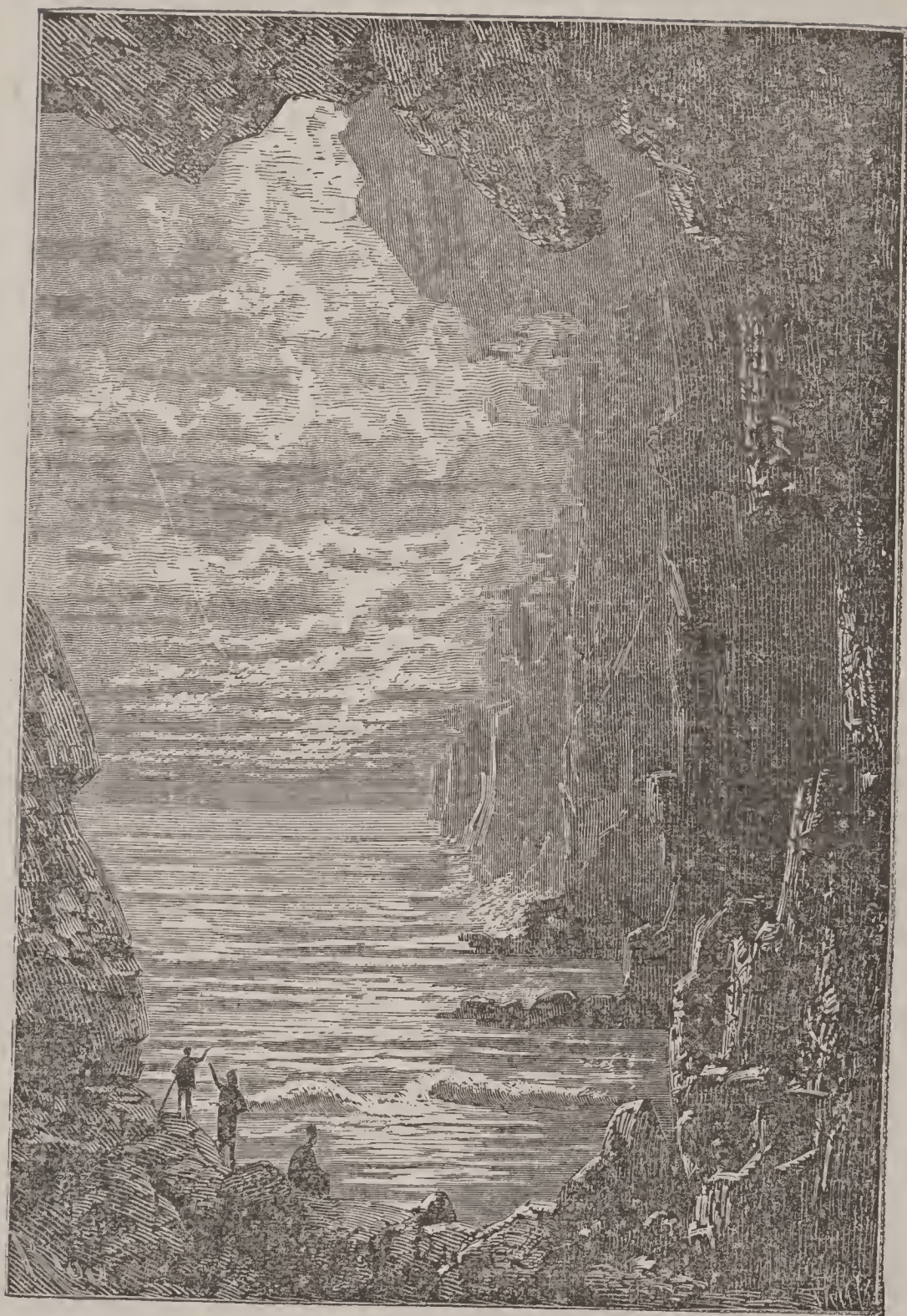
THE CENTRAL SEA.

AT first I saw absolutely nothing. My eyes, wholly unused to the effulgence of light, could not bear the sudden brightness; and I was compelled to close them. When I was able to re-open them, I stood still, far more stupefied than astonished. Not all the wildest effects of imagination could have conjured up such a scene!

“The sea—the sea,” I cried.

“Yes,” replied my uncle, in a tone of pardonable pride; “The Central Sea. No future navigator will deny the fact of my having discovered it; and hence of acquiring a right of giving it a name.”

It was quite true. A vast, limitless expanse of water, the end of a lake if not of an ocean, spread before us, until it was lost in the distance. The shore, which was very much indented, consisted of a beautiful soft golden sand, mixed with small shells, the long deserted home of some of the creatures of a past age. The waves broke incessantly, and with a peculiarly sonorous murmur—to be found in under-ground localities. A slight frothy flake arose as the wind blew along the pellucid waters; and many a dash of spray was blown into my face. The mighty superstructure of rock which rose above to an inconceivable height, left only a narrow opening—but where we stood, there was a large margin of strand. On all sides were capes and promontories and enormous cliffs, partially worn by the eternal breaking of the waves, through countless ages! And as I gazed from side to side, the mighty rocks faded away like a fleecy film of cloud.



THE CENTRAL SEA.

It was in reality an ocean, with all the usual characteristics of an inland sea, only horribly wild—so rigid, cold and savage.

One thing startled and puzzled me greatly. How was it that I was able to look upon that vast sheet of water instead of being plunged in utter darkness? The vast landscape before me was lit up like day. But there was wanting the dazzling brilliancy, the splendid irradiation of the sun; the pale cold illumination of the moon; the brightness of the stars. The illuminating power in this subterraneous region, from its trembling and flickering character, its clear dry whiteness, the very slight elevation of its temperature, its great superiority to that of the moon, was evidently electric; something in the nature of the aurora borealis, only that its phenomena were constant, and able to light up the whole of the ocean cavern.

The tremendous vault above our heads, the sky, so to speak, appeared to be composed of a conglomeration of nebulous vapors, in constant motion. I should originally have supposed, that under such an atmospheric pressure as must exist in that place, the evaporation of water could not really take place, and yet from the action of some physical law, which escaped my memory, there were heavy and dense clouds rolling along that mighty vault, partially concealing the roof. Electric currents produced astonishing play of light and shade in the distance, especially around the heavier clouds. Deep shadows were cast beneath, and then suddenly, between two clouds, there would come a ray of unusual beauty, and remarkable intensity. And yet it was not like the sun, for it gave no heat.

The effect was sad and excruciatingly melancholy. Instead of a noble firmament of blue, studded with stars, there was above me a heavy roof of granite, which seemed to crush me.

Gazing around, I began to think of the theory of the English captain, who compared the earth to a vast hollow sphere in the interior of which the air is retained in a luminous state by means of atmospheric pressure, while two stars, Pluto and Proserpine, circled there in their mysterious orbits. After all, suppose the old fellow was right!

In truth, we were imprisoned—bound as it were, in a vast excavation. Its width it was impossible to make out; the shore, on either hand, widening rapidly until lost to sight; while its length was equally uncertain. A haze on the distant horizon bounded our view. As to its height we could see that it must be many miles to the roof. Looking upward, it was impossible to discover where the stupendous roof began. The lowest of the clouds must have been floating at an elevation of two thousand yards, a height greater than that of terrestrial vapors, which circumstance was doubtless owing to the extreme density of the air.

I use the word cavern in order to give an idea of the place. I cannot describe its awful grandeur; human language fails to convey an idea of its savage sublimity. Whether this singular vacuum had or had not been caused by the sudden cooling of the earth when in a state of fusion, I could not say. I had read of most wonderful and gigantic caverns—but none in any way like this.

The great grotto of Guachara, in Columbia, visited by the learned Humboldt; the vast and partially explored Mammoth Cave in Kentucky; what were these holes in the earth to that in which I stood in speechless admiration! with its vapory clouds, its electric light, and the mighty ocean slumbering in its bosom! Imagination, not description, can alone give an idea of the splendor and vastness of the cave.

I gazed at these marvels in profound silence. Words

were utterly wanting to indicate the sensations of wonder I experienced. I seemed, as I stood upon that mysterious shore, as if I were some wandering inhabitant of a distant planet, present for the first time at the spectacle of some terrestrial phenomena belonging to another existence. To give body and existence to such new sensations, would have required the coinage of new words—and here my feeble brain found itself wholly at fault. I looked on, I thought, I reflected, I admired, in a state of stupefaction not altogether unmingled with fear!

The unexpected spectacle restored some color to my pallid checks. I seemed to be actually getting better under the influence of this novelty. Moreover, the vivacity of the dense atmosphere, reanimated my body, by inflating my lungs with unaccustomed oxygen.

It will be readily conceived that after an imprisonment of forty-seven days, in a dark and miserable tunnel, it was with infinite delight that I breathed this saline air. It was like the genial, reviving influence of the salt sea waves.

My uncle had already got over the first surprise.

With the Latin poet Horace his idea was that—

“Not to admire is all the art I know,
To make man happy and to keep him so.”

“Well,” he said, after giving me time thoroughly to appreciate the marvels of this underground sea, “do you feel strong enough to walk up and down?”

“Certainly,” was my ready answer, “nothing would give me greater pleasure.”

“Well then, my boy,” he said, “lean on my arm, and we will stroll along the beach.”

I accepted his offer eagerly, and we began to walk along the shores of this extraordinary lake. To our left were abrupt rocks, piled one upon the other,—a stupendous titanic pile; down their sides leapt innumerable cascades,

which at last, becoming limpid and murmuring streams, were lost in the waters of the lake. Light vapors, which rose here and there, and floated in fleecy clouds from rock to rock, indicated hot springs, which also poured their superfluity into the vast reservoir at our feet.

Among them I recognized our old and faithful stream, the Hansbach, which, lost in that wild basin, seemed as if it had been flowing since the creation of the world.

“We shall miss our excellent friend,” I remarked, with a deep sigh.

“Bah!” said my uncle, testily, “what matters it. That or another, it is all the same.”

I thought the remark ungrateful, and felt almost inclined to say so; but I forbore.

At this moment my attention was attracted by an unexpected spectacle. After we had gone about five hundred yards, we suddenly turned a steep promontory, and found ourselves close to a lofty forest! It consisted of straight trunks with tufted tops, in shape like parasols. The air seemed to have no effect upon these trees—which in spite of a tolerable breeze remained as still and motionless as if they had been petrified.

I hastened forward. I could find no name for these singular formations. Did they not belong to the two thousand and more known trees—or were we to make the discovery of a new growth? By no means. When we at last reached the forest, and stood beneath the trees, my surprise gave way to admiration.

In truth, I was simply in the presence of a very ordinary product of the earth, of singular and gigantic proportions. My uncle unhesitatingly called them by their real names.

“It is only,” he said, in his coolest manner, “a forest of mushrooms.”

On close examination I found that he was not mistaken.

Judge of the development attained by this product of damp hot soils. I had heard that the *lycoperdon giganteum* reaches nine feet in circumference, but here were white mushrooms, nearly forty feet high, and with tops of equal dimensions. They grew in countless thousands—the light could not make its way through their massive substance, and beneath them reigned a gloomy and mystic darkness.

Still I wished to go forward. The cold in the shades of this singular forest was intense. For nearly an hour we wandered about in this darkness visible. At length I left the spot, and once more returned to the shores of the lake, to light and comparative warmth.

But the amazing vegetation of subterraneous land was not confined to gigantic mushrooms. New wonders awaited us at every step. We had not gone many hundred yards, when we came upon a mighty group of other trees with discolored leaves—the common humble trees of mother earth, of an exorbitant and phenomenal size: lycopodes a hundred feet high; flowering ferns as tall as pines; gigantic grasses!

“Astonishing, magnificent, splendid!” cried my uncle; “here we have before us the whole Flora of the second period of the world, that of transition. Behold the humble plants of our gardens, which in the first ages of the world were mighty trees. Look around you, my dear Harry. No botanist ever before gazed on such a sight!”

My uncle’s enthusiasm, always a little more than was required, was now excusable.

“You are right, uncle,” I remarked. “Providence appears to have designed the preservation in this vast and mysterious hot-house of antediluvian plants, to prove the sagacity of learned men in figuring them so marvellously on paper.”

“Well said, my boy—very well said; it is indeed a mighty hot-house;—but you would also be within the

bounds of reason and common sense, if you also added—a vast menagerie.”

I looked rather anxiously around. If the animals were as exaggerated as the plants, the matter would certainly be serious.

“A menagerie?”

“Doubtless. Look at the dust we are treading under foot—behold the bones with which the whole soil of the sea shore is covered——”

“Bones,” I replied, “yes, certainly, the bones of antediluvian animals.”

I stooped down as I spoke, and picked up one or two singular remains, relics of a by-gone age. It was easy to give a name to these gigantic bones, in some instances as big as trunks of trees.

“Here is, clearly, the lower jaw-bone of a mastodon,” I cried, almost as warmly and enthusiastically as my uncle, “here are the molars of the dinotherium; here is a leg-bone which belonged to the megatherium. You are right, uncle, it is indeed a menagerie; for the mighty animals to which these bones once belonged, have lived and died on the shores of this subterranean sea, under the shadow of these plants. Look, yonder are whole skeletons—and yet——”

“And yet, nephew?” said my uncle, noticing that I suddenly came to a full stop.

“I do not understand the presence of such beasts in granite caverns, however vast and prodigious,” was my reply.

“Why not?” said my uncle, with very much of his old professional impatience.

“Because it is well known that animal life only existed on earth during the secondary period, when the sedimentary soil was formed by the alluviums, and thus replaced the hot and burning rocks of the primitive age.”

"I have listened to you earnestly and with patience, Harry, and I have a simple and clear answer to your objections: and that is, that this itself is a sedimentary soil."

"How can that be at such enormous depth from the surface of the earth?"

"The fact can be explained both simply and geologically. At a certain period, the earth consisted only of an elastic crust, liable to alternative upward and downward movements in virtue of the law of attraction. It is very probable that many a landslip took place in those days, and that large portions of sedimentary soil were cast into huge and mighty chasms."

"Quite possible," I drily remarked. "But uncle, if these antediluvian animals formerly lived in these subterranean regions, what more likely that one of these huge monsters may at this moment be concealed behind one of yonder mighty rocks."

As I spoke, I looked keenly around, examining with care every point of the horizon; but nothing alive appeared to exist on these deserted shores.

I now felt rather fatigued, and told my uncle so. The walk and excitement were too much for me in my weak state. I therefore seated myself at the end of a promontory, at the foot of which the waves broke in incessant rolls. I looked round a bay formed by projections of vast granitic rocks. At the extreme end was a little port protected by huge pyramids of stones. A brig and three or four schooners might have lain there with perfect ease. So natural did it seem, that every minute my imagination induced me to expect a vessel coming out under all sail and making for the open sea under the influence of a warm southerly breeze.

But the fantastic illusion never lasted more than a minute. We were the only living creatures in this subterranean world!

During certain periods there was an utter cessation of wind, when a silence deeper, more terrible than the silence of the desert fell upon these solitary and arid rocks—and seemed to hang like a leaden weight upon the waters of this singular ocean. I sought, amid the awful stillness, to penetrate through the distant fog, to tear down the veil which concealed the mysterious distance. What unspoken words were murmured by my trembling lips—what questions did I wish to ask and did not! Where did this sea end—to what did it lead? Should we ever be able to examine its distant shores?

But my uncle had no doubts about the matter. He was convinced that our enterprise would in the end be successful. For my part, I was in a state of painful indecision—I desired to embark on the journey and to succeed, and still I feared the result.

After we had passed an hour or more in silent contemplation of the wondrous spectacle, we rose and went down towards the bank on our way to the grotto, which I was not sorry to gain. After a slight repast, I sought refuge in slumber, and at length, after many and tedious struggles, sleep came over my weary eyes.

CHAPTER XXVIII.

LAUNCHING THE RAFT.

ON the morning of the next day, to my great surprise, I awoke completely restored. I thought a bath would be delightful after my long illness and sufferings. So, soon after rising, I went and plunged into the waters of this new Mediterranean. The bath was cool, fresh and invigorating.

I came back to breakfast with an excellent appetite. Hans, our worthy guide, thoroughly understood how to cook such eatables as we were able to provide; he had both fire and water at discretion, so that he was enabled slightly to vary the weary monotony of our ordinary repast.

Our morning meal was like a capital English breakfast, with coffee by way of a wind up. And never had this delicious beverage been so welcome and refreshing.

My uncle had sufficient regard for my state of health not to interrupt me in the enjoyment of the meal, but he was evidently delighted when I had finished.

"Now then," said he, "come with me. It is the height of the tide, and I am anxious to study its curious phenomena."

"What," I cried, rising in astonishment, "did you say the tide, uncle?"

"Certainly I did."

"You do not mean to say," I replied, in a tone of respectful doubt, "that the influence of the sun and moon is felt here below?"

"And pray why not? Are not all bodies influenced by the law of universal attraction? Why should this vast

underground sea be exempt from the general law, the rule of the universe? Besides, there is nothing like that which is proved and demonstrated. Despite the great atmospheric pressure down here, you will notice that this inland sea rises and falls with as much regularity as the Atlantic itself."

As my uncle spoke, we reached the sandy shore, and saw and heard the waves breaking monotonously on the beach. They were evidently rising.

"This is truly the flood," I cried, looking at the water at my feet.

"Yes, my excellent nephew," replied my uncle, rubbing his hands with the gusto of a philosopher, "and you see by these several streaks of foam, that the tide rises at least ten or twelve feet."

"It is indeed marvellous."

"By no means," he responded; "on the contrary, it is quite natural."

"It may appear so in your eyes, my dear uncle," was my reply, "but the whole phenomena of the place appear to me to partake of the marvellous. It is almost impossible to believe that which I see. Who in his wildest dreams could have imagined that, beneath the crust of our earth, there could exist a real ocean, with ebbing and flowing tides, with its changes of winds, and even its storms. I for one should have laughed the suggestion to scorn."

"But, Harry, my boy, why not?" inquired my uncle, with a pitying smile, "is there any physical reason in opposition to it?"

"Well, if we give up the great theory of the central heat of the earth, I certainly can offer no reasons why anything should be looked upon as impossible."

"Then you will own," he added, "that the system of Sir Humphrey Davy is wholly justified by what we have seen?"

"I allow that it is—and that point once granted, I certainly can see no reason for doubting the existence of seas and other wonders, even countries, in the interior of the globe."

"That is so—but of course these varied countries are uninhabited?"

"Well, I grant that it is more likely than not: still, I do not see why this sea should not have given shelter to some species of unknown fish."

"Hitherto we have not discovered any, and the probabilities are rather against our ever doing so," observed the Professor.

I was losing my skepticism in the presence of these wonders.

"Well, I am determined to solve the question. It is my intention to try my luck with my fishing line and hook."

"Certainly; make the experiment," said my uncle, pleased with my enthusiasm. "While we are about it, it will certainly be only proper to discover all the secrets of this extraordinary region."

"But, after all, where are we now?" I asked; "all this time I have quite forgotten to ask you a question, which, doubtless, your philosophical instruments have long since answered."

"Well," replied the Professor, "examining the situation from only one point of view, we are now distant three hundred and fifty leagues from Iceland."

"So much?" was my exclamation.

"I have gone over the matter several times, and am sure not to have made a mistake of five hundred yards," replied my uncle positively.

"And as to the direction—are we still going to the south-east?"

"Yes, with a western declination* of nineteen degrees,

* The declination is the variation of the needle from the true meridian of a place.

forty-two minutes, just as it is above. As for the inclination* I have discovered a very curious fact."

"What may that be, uncle? Your information interests me."

"Why that the needle, instead of dipping towards the pole as it does on earth, in the northern hemisphere, has an upward tendency."

"This proves," I cried, "that the great point of magnetic attraction lies somewhere between the surface of the earth and the spot we have succeeded in reaching."

"Exactly, my observant nephew," exclaimed my uncle, elated and delighted, "and it is quite probable that if we succeed in getting toward the polar regions—somewhere near the seventy-third degree of latitude, where Sir James Ross discovered the magnetic pole, we shall behold the needle point directly upward. We have therefore discovered by analogy, that this great centre of attraction is not situated at a very great depth."

"Well," said I, rather surprised, "this discovery will astonish experimental philosophers. It was never suspected."

"Science, great, mighty and in the end unerring," replied my uncle dogmatically, "science has fallen into many errors—errors which have been fortunate and useful rather than otherwise, for they have been the stepping-stones to truth."

After some further discussion, I turned to another matter.

"Have you any idea of the depth we have reached?"

"We are now," continued the Professor, "exactly thirty-five leagues—above a hundred miles—down into the interior of the earth."

"So," said I, after measuring the distance on the map,

* Inclination is the dip of the magnetic needle with a tendency to incline towards the earth.

"we are now beneath the Scottish Highlands, and have over our heads the lofty Grampian hills."

"You are quite right," said the Professor laughing, "it sounds very alarming, the weight being heavy—but the vault which supports this vast mass of earth and rock is solid and safe—the mighty Architect of the Universe has constructed it of solid materials. Man, even in his highest flights of vivid and poetic imagination, never thought of such things! What are the finest arches of our bridges, what the vaulted roofs of our cathedrals, to that mighty dome above us, and beneath which floats an ocean with its storms and calms and tides!"

"I admire it all as much as you can, uncle, and have no fear that our granite sky will fall upon our heads. But now that we have discussed matters of science and discovery, what are your future intentions? Are you not thinking of getting back to the surface of our beautiful earth?"

This was said more as a feeler than with any hope of success.

"Go back, nephew," cried my uncle in a tone of alarm, "you are not surely thinking of anything so absurd or cowardly. No, my intention is to advance and continue our journey. We have as yet been singularly fortunate, and henceforth I hope we shall be more so."

"But," said I, "how are we to cross yonder liquid plain?"

"It is not my intention to leap into it head foremost, or even to swim across it, like Leander over the Hellespont. But as oceans are, after all, only great lakes, inasmuch as they are surrounded by land, so does it stand to reason, that this central sea is circumscribed by granite surroundings."

"Doubtless," was my natural reply.

"Well, then, do you not think that when once we reach the other end, we shall find some means of continuing our journey?"

"Probably, but what extent do you allow to this internal ocean?"

"Well, I should fancy it to extend about forty or fifty leagues—more or less."

"But even supposing this approximation to be a correct one—what then?" I asked.

"My dear boy, we have no time for further discussion. We shall embark to-morrow."

I looked around with surprise and incredulity. I could see nothing in the shape of boat or vessel.

"What!" I cried, "we are about to launch out upon an unknown sea; and where, if I may ask, is the vessel to carry us?"

"Well, my dear boy, it will not be exactly what you would call a vessel. For the present we must be content with a good and solid raft."

"A raft," I cried, incredulously, "but down here a raft is as impossible of construction as a vessel—and I am at a loss to imagine—"

"My good Harry—if you were to listen instead of talking so much, you would hear," said my uncle, waxing a little impatient.

"I should hear?"

"Yes—certain knocks with the hammer, which Hans is now employing to make the raft. He has been at work for many hours."

"Making a raft?"

"Yes."

"But where has he found trees suitable for such a construction?"

"He found the trees all ready to his hand. Come, and you shall see our excellent guide at work."

More and more amazed at what I heard and saw, I followed my uncle like one in a dream.

After a walk of about a quarter of an hour, I saw Hans at

work on the other side of the promontory which formed our natural port. A few minutes more and I was beside him. To my great surprise, on the sandy shore lay a half-finished raft. It was made from beams of a very peculiar wood, and a great number of limbs, joints, boughs, and pieces lay about, sufficient to have constructed a fleet of ships and boats.

I turned to my uncle, silent with astonishment and awe.

"Where did all this wood come from?" I cried; "what wood is it?"

"Well, there is pine-wood, fir, and the palms of the northern regions, mineralized by the action of the sea," he replied, sententiously.

"Can it be possible?"

"Yes," said the learned Professor, "what you see is called fossil wood."

"But then," cried I, after reflecting for a moment, "like the lignites, it must be as hard and as heavy as iron, and therefore will certainly not float."

"Sometimes that is the case. Many of these woods have become true anthracites, but others again, like those you see before you, have only undergone one phase of fossil transformation. But there is no proof like demonstration," added my uncle, picking one or two of these precious waifs and casting them into the sea.

The piece of wood, after having disappeared for a moment, came to the surface, and floated about with the oscillation produced by wind and tide.

"Are you convinced?" said my uncle, with a self-satisfied smile.

"I am convinced," I cried, "that what I see is incredible."

The fact was that my journey into the interior of the earth was rapidly changing all preconceived notions, and day by day preparing me for the marvellous.

I should not have been surprised to have seen a fleet of native canoes afloat upon that silent sea.

The very next evening, thanks to the industry and ability of Hans, the raft was finished. It was about ten feet long and five feet wide. The beams bound together with stout ropes, were solid and firm, and once launched by our united efforts, the improvised vessel floated tranquilly upon the waters of what the Professor had well named the Central Sea.

CHAPTER XXIX.

ON THE WATERS.—A RAFT VOYAGE.

ON the 13th of August we were up betimes. There was no time to be lost. We now had to inaugurate a new kind of locomotion, which would have the advantage of being rapid and not fatiguing.

A mast, made of two pieces of wood fastened together, to give additional strength, a yard made from one, the sail a linen sheet from our bed. We were fortunately in no want of cordage, and the whole on trial appeared solid and seaworthy.

At six o'clock in the morning, when the eager and enthusiastic Professor gave the signal to embark, the victuals, the luggage, all our instruments, our weapons, and a goodly supply of sweet water, which we had collected from springs in the rocks, were placed on the raft.

Hans had, with considerable ingenuity, contrived a rudder, which enabled him to guide the floating apparatus with ease. He took the tiller, as a matter of course. The worthy man was as good a sailor as he was a guide and duck-hunter. I then let go the painter which held us to the shore, the sail was brought to the wind, and we made a rapid offing.

Our sea voyage had at length commenced; and once more we were making for distant and unknown regions.

Just as we were about to leave the little port where the raft had been constructed, my uncle, who was very strong as to geographic nomenclature, wanted to give it a name, and among others, suggested mine.

"Well," said I, "before you decide I have another to propose."

"Well; out with it."

"I should like to call it Gretchen. Port Gretchen will sound very well on our future map."

"Well then, Port Gretchen let it be," said the Professor.

And thus it was that the memory of my dear girl was attached to our adventurous and memorable expedition.

When we left the shore the wind was blowing from the northward and eastward. We went directly before the wind at a much greater speed than might have been expected from a raft. The dense layers of atmosphere at that depth had great propelling power and acted upon the sail with considerable force.

At the end of an hour, my uncle, who had been taking careful observations, was enabled to judge of the rapidity with which we moved. It was far beyond anything seen in the upper world.

"If," he said, "we continue to advance at our present rate, we shall have travelled at least thirty leagues in twenty-four hours. With a mere raft this is an almost incredible velocity."

I certainly was surprised, and without making any reply went forward upon the raft. Already the northern shore was fading away on the edge of the horizon. The two shores appeared to separate more and more, leaving a wide and open space for our departure. Before me I could see nothing but the vast and apparently limitless sea—upon which we floated—the only living objects in sight.

Huge and dark clouds cast their grey shadows below—shadows which seemed to crush that colorless and sullen water by their weight. Anything more suggestive of gloom and of regions of nether darkness I never beheld. Silvery rays of electric light, reflected here and there upon some small spots of water, brought up luminous sparkles in the long wake of our cumbrous bark. Presently we were wholly out of sight of land, not a vestige could be seen,

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nor any indication of where we were going. So still and motionless did we seem without any distant point to fix our eyes on, that but for the phosphoric light at the wake of the raft I should have fancied that we were still and motionless.

But I knew that we were advancing at a very rapid rate.

About twelve o'clock in the day, vast collections of seaweed were discovered surrounding us on all sides. I was aware of the extraordinary vegetative power of these plants, which have been known to creep along the bottom of the great ocean, and stop the advance of large ships. But never were seaweeds ever seen, so gigantic and wonderful as those of the Central Sea. I could well imagine how, seen at a distance, tossing and heaving on the summit of the billows, the long lines of Algæ have been taken for living things, and thus have been the fertile sources of the belief in sea serpents.

Our raft swept past great specimens of fuçæ or seawrack, from three to four thousand feet in length, immense, incredibly long, looking like snakes that stretched out far beyond our horizon. It afforded me great amusement to gaze on their variegated ribbon-like endless lengths. Hour after hour passed without our coming to the termination of these floating weeds. If my astonishment increased, my patience was well-nigh exhausted.

What natural force could possibly have produced such abnormal and extraordinary plants? What must have been the aspect of the globe, during the first centuries of its formation, when under the combined action of heat and humidity, the vegetable kingdom occupied its vast surface to the exclusion of everything else?

These were considerations of never-ending interest for the geologist and the philosopher.

All this while we were advancing on our journey; and at length night came; but as I had remarked the evening

before, the luminous state of the atmosphere was in nothing diminished. Whatever was the cause, it was a phenomenon upon the duration of which we could calculate with certainty.

As soon as our supper had been disposed of, and some little speculative conversation indulged in, I stretched myself at the foot of the mass, and presently went to sleep.

Hans remained motionless at the tiller, allowing the raft to rise and fall on the waves. The wind being aft, and the sail square, all he had to do was to keep his oar in the centre.

Ever since we had taken our departure from the newly-named Port Gretchen, my worthy uncle had directed me to keep a regular log of our day's navigation, with instructions to put down even the most minute particulars, every interesting and curious phenomenon, the direction of the wind, our rate of sailing, the distance we went; in a word, every incident of our extraordinary voyage.

From our log, therefore, I tell the story of our voyage on the Central Sea.

Friday, August 14th. A steady breeze from the north-west. Raft progressing with extreme rapidity, and going perfectly straight. Coast still dimly visible about thirty leagues to leeward. Nothing to be seen beyond the horizon in front. The extraordinary intensity of the light neither increases nor diminishes. It is singularly stationary. The weather remarkably fine; that is to say, the clouds have ascended very high, and are light and fleecy, and surrounded by an atmosphere resembling silver in fusion.

Thermometer + 32 degrees centigrade.

About twelve o'clock in the day our guide Hans having prepared and baited a hook, cast his line into the subterranean waters. The bait he used was a small piece of meat, by means of which he concealed his hook. Anxious

as I was, I was for a long time doomed to disappointment. Were these waters supplied with fish or not? That was the important question. No—was my decided answer. Then there came a sudden and rather hard tug. Hans coolly drew it in, and with it a fish, which struggled violently to escape.

“A fish,” cried my uncle, putting on his spectacles to examine it.

“It is a sturgeon!” I cried, “certainly a small sturgeon.”

The Professor examined the fish carefully, noting every characteristic; and he did not coincide in my opinion. The fish had a flat head, round body, and the lower extremities covered with bony scales; its mouth was wholly without teeth, the pectoral fins, which were highly developed, sprouted direct from the body, which properly speaking had no tail. The animal certainly belonged to the order in which naturalists class the sturgeon, but it differed from that fish in many essential particulars.

My uncle, after all, was not mistaken. After a long and patient examination, he said—

“This fish, my dear boy, belongs to a family which has been extinct for ages, and of which no trace has ever been found on earth, except fossil remains in the Devonian strata.”

“You do not mean to say,” I cried, “that we have captured a live specimen of a fish belonging to the primitive stock that existed before the deluge?”

“We have,” said the Professor, who all this time was continuing his observations, “and you may see by careful examination that these fossil fish have no identity with existing species. To hold in one’s hand, therefore, a living specimen of the order, is enough to make a naturalist happy for life.”

“But,” cried I, “to what family does it belong?”

“To the order of Ganoides—an order of fish having

angular scales, covered with bright enamel—forming one of the family of the Cephalaspides, of the genus——”

“Well, sir,” I remarked, as I noticed my uncle hesitated to conclude.

“To the Genus *Pterychtis*—yes, I am certain of it. Still, though I am confident of the correctness of my surmise, this fish offers to our notice a remarkable peculiarity, never known to exist in any other fish but those which are the natives of subterranean waters, wells, lakes, in caverns, and such like hidden pools.”

“And what may that be?”

“It is blind.”

“Blind!” I cried, much surprised.

“Not only blind,” continued the Professor, “but absolutely without organs of sight.”

I now examined our discovery for myself. It was singular, to be sure, but it was really a fact. This, however, might be a solitary instance, I suggested. The hook was baited again and once more thrown into the water. This subterranean ocean must have been tolerably well supplied with fish, for in two hours we took a large number of *Pterychtis*, as well as other fish belonging to another supposed extinct family—the *Dipterides* (a genus of fish, furnished with two fins only, whence the name), though my uncle could not class it exactly. All, without exception, however, were blind. This unexpected capture enabled us to renew our stock of provisions in a very satisfactory way.

We were now convinced that this Subterranean Sea contained only fish known to us as fossil specimens—and fish and reptiles alike, were all the more perfect the farther back they dated their origin.

We began to hope that we should find some of those Saurians which science has succeeded in reconstructing from bits of bone or cartilage.

I took up the telescope and carefully examined the horizon—looked over the whole sea; it was utterly and entirely deserted. Doubtless we were still too near the coast.

After an examination of the ocean, I looked upward, towards the strange and mysterious sky. Why should not one of the birds, reconstructed by the immortal Cuvier, flap his stupendous wings aloft in the dull strata of subterranean air? It would, of course, find quite sufficient food from the fish in the sea. I gazed for some time upon the void above. It was as silent and as deserted as the shores we had but lately left.

Nevertheless, though I could neither see nor discover anything, my imagination carried me away into wild hypotheses. I was in a kind of waking dream. I thought I saw on the surface of the water those enormous antediluvian turtles as big as floating islands. Upon those dull and sombre shores passed a spectral row of the mammals of early days, the great *Leptotherium* found in the cavernous hollow of the Brazilian hills, the *Mesotherium*, a native of the glacial regions of Siberia.

Farther on, the pachydermatous *Lophrodon*, that gigantic tapir, which concealed itself behind rocks, ready to do battle for its prey with the *Anoplotherium*, a singular animal partaking of the nature of the rhinoceros, the horse, the hippopotamus and the camel.

There was the giant *Mastodon*, twisting and turning his horrid trunk, with which he crushed the rocks of the shore to powder, while the *Megatherium*—his back raised like a cat in a passion, his enormous claws stretched out, dug into the earth for food, at the same time that he awoke the sonorous echoes of the whole place with his terrible roar.

Higher up still, the first monkey ever seen on the face of the globe clambered, gamboling and playing up the

granite hills. Still farther away, ran the Pterodactyl, with the winged hand, gliding or rather sailing through the dense and compressed air like a huge bat.

Above all, near the leaden granitic sky, were immense birds, more powerful than the casoar, giants to the ostrich, which spread their mighty wings and fluttered against the huge stone vault of the inland sea.

I thought, such was the effect of my imagination, that I saw this whole tribe of antediluvian creatures. I carried myself back to far ages, long before man existed—when, in fact, the earth was in too imperfect a state for him to live upon it.

My dream was of countless ages before the existence of man. The mammifers first disappeared, then the mighty birds, then the reptiles of the secondary period, presently the fish, the crustacea, the molluscs, and finally the vertebrata. The zoophytes of the period of transition in their turn sank into annihilation.

The whole panorama of the world's life before the historic period, seemed to be born over again, and mine was the only human heart that beat in this unpeopled world! There were no more seasons; there were no more climates; the natural heat of the world increased unceasingly, and neutralized that of the great radiant Sun.

Vegetation was exaggerated in an extraordinary manner. I passed like a shadow in the midst of brushwood as lofty as the giant trees of California, and trod underfoot the moist and humid soil, reeking with a rank and varied vegetation.

I leaned against the huge column-like trunks of giant trees, to which those of Canada were as ferns. Whole ages passed, hundreds upon hundreds of years were concentrated into a single day.

Next, unrolled before me like a panorama, came the great and wondrous series of terrestrial transformations.



THE ANTEDILUVIAN WORLD.

Plants disappeared; the granitic rocks lost all trace of solidity; the liquid state was suddenly substituted for that which had before existed. This was caused by intense heat acting on the organic matter of the earth. The waters flowed over the whole surface of the globe; they boiled; they were volatilized, or turned into vapor; a kind of steam-cloud wrapped the whole earth, the globe itself becoming at last nothing but one huge sphere of gas, indescribable in color, between white heat and red, as big and as brilliant as the sun.

In the very centre of this prodigious mass, fourteen hundred thousand times as large as our globe, I was whirled round in space, and brought into close conjunction with the planets. My body was subtilized, or rather became volatile, and commingled in a state of atomic vapor, with the prodigious clouds, which rushed forward like a mighty comet into infinite space!

What an extraordinary dream! Where would it finally take me? My feverish hand began to write down the marvellous details—details more like the imaginings of a lunatic than anything sober and real. I had during this period of hallucination forgotten everything—the Professor, the guide, and the raft on which we were floating. My mind was in a state of semi-oblivion.

“What is the matter, Harry?” said my uncle, suddenly.

My eyes, which were wide opened like those of a somnambulist, were fixed upon him, but I did not see him, nor could I clearly make out anything around me.

“Take care, my boy,” again cried my uncle, “you will fall into the sea.”

As he uttered these words, I felt myself seized on the other side by the firm hand of our devoted guide. Had it not been for the presence of mind of Hans, I must infallibly have fallen into the waves and been drowned.

"Have you gone mad?" cried my uncle, shaking me on the other side.

"What—what is the matter?" I said at last, coming to myself.

"Are you ill, Henry?" continued the Professor in an anxious tone.

"No—no; but I have had an extraordinary dream. It, however, has passed away. All now seems well," I added, looking around me with strangely puzzled eyes.

"All right," said my uncle; "a beautiful breeze, a splendid sea. We are going along at a rapid rate, and if I am not out in my calculations we shall soon see land. I shall not be sorry to exchange the narrow limits of our raft for the mysterious strand of the Subterranean Ocean."

As my uncle uttered these words, I rose and carefully scanned the horizon. But the line of water was still confounded with the lowering clouds that hung aloft, and in the distance appeared to touch the edge of the water.

CHAPTER XXX.

TERRIFIC SAURIAN COMBAT.

SATURDAY, August 15. The sea still retains its uniform monotony. The same leaden hue, the same eternal glare from above. No indication of land being in sight. The horizon appears to retreat before us, more and more as we advance.

My head, still dull and heavy from the effects of my extraordinary dream, which I cannot as yet banish from my mind.

The Professor, who has not dreamed, is, however, in one of his morose and unaccountable humors. Spends his time in scanning the horizon, at every point of the compass. His telescope is raised every moment to his eyes, and when he finds nothing to give any clue to our whereabouts, he assumes a Napoleonic attitude and walks anxiously.

I remarked that my uncle, the Professor, had a strong tendency to resume his old impatient character, and I could not but make a note of this disagreeable circumstance in my Journal. I saw clearly that it had required all the influence of my danger and suffering, to extract from him one scintillation of humane feeling. Now that I was quite recovered, his original nature had conquered and obtained the upper hand.

And, after all, what had he to be angry and annoyed about, now more than at any other time? Was not the journey being accomplished under the most favorable circumstances? Was not the raft progressing with the most marvellous rapidity?

What, then, could be the matter? After one or two preliminary hems, I determined to inquire.

"You seem uneasy, uncle," said I, when for about the hundredth time he put down his telescope and walked up and down, muttering to himself.

"No, I am not uneasy," he replied in a dry harsh tone, "by no means."

"Perhaps I should have said impatient," I replied, softening the force of my remark.

"Enough to make me so, I think."

"And yet we are advancing at a rate seldom attained by a raft," I remarked.

"What matters that?" cried my uncle. "I am not vexed at the rate we go at, but I am annoyed to find the sea so much vaster than I expected."

I then recollected that the Professor, before our departure, had estimated the length of this Subterranean Ocean, as at most about thirty leagues. Now we had travelled at least over thrice that distance without discovering any trace of the distant shore. I began to understand my uncle's anger.

"We are not going down," suddenly exclaimed the Professor. "We are not progressing with our great discoveries. All this is utter loss of time. After all, I did not come from home to undertake a party of pleasure. This voyage on a raft over a pond annoys and wearies me."

He called this adventurous journey a party of pleasure, and this great Inland Sea a pond!

"But," argued I, "if we have followed the route indicated by the great Saknussem, we cannot be going far wrong."

"That is the question," as the great, the immortal Shakspeare, has it. Are we following the route indicated by that wondrous sage? Did Saknussem ever fall in

with this great sheet of water? If he did, did he cross it? I begin to fear that the rivulet we adopted for a guide has led us wrong."

"In any case, we can never regret having come thus far. It is worth the whole journey to have enjoyed this magnificent spectacle—it is something to have seen."

"I care nothing about seeing, nor about magnificent spectacles. I came down into the interior of the earth with an object, and that object I mean to attain. Don't talk to me about admiring scenery, or any other sentimental trash."

After this I thought it well to hold my tongue, and allow the Professor to bite his lips until the blood came, without further remark.

At six o'clock in the evening, our matter-of-fact guide, Hans, asked for his week's salary, and receiving his three rix-dollars, put them carefully in his pocket. He was perfectly contented and satisfied.

Sunday, 16th August. Nothing new to record. The same weather as before. The wind has a slight tendency to freshen up, with signs of an approaching gale. When I awoke, my first observation was in regard to the intensity of the light. I keep on fearing, day after day, that the extraordinary electric phenomenon should become first obscured, and then go wholly out, leaving us in total darkness. Nothing, however, of the kind occurs. The shadow of the raft, its mast and sails, is clearly distinguished on the surface of the water.

This wondrous sea is, after all, infinite in its extent. It must be quite as wide as the Mediterranean—or perhaps even as the great Atlantic Ocean. Why, after all, should it not be so?

My uncle has on more than one occasion, tried deep sea soundings. He tied the cross of one of our heaviest crow-bars to the extremity of a cord, which he allowed to run

out to the extent of two hundred fathoms. We had the greatest difficulty in hoisting in our novel kind of lead.

When the crowbar was finally dragged on board, Hans called my attention to some singular marks upon its surface. The piece of iron looked as if it had been crushed between two very hard substances.

I looked at our worthy guide with an inquiring glance.

"Tänder," said he.

Of course I was at a loss to understand. I turned round towards my uncle, absorbed in gloomy reflections. I had little wish to disturb him from his reverie. I accordingly turned once more towards our worthy Iclander.

Hans very quietly and significantly opened his mouth once or twice, as if in the act of biting, and in this way made me understand his meaning.

"Teeth!" cried I, with stupefaction, as I examined the bar of iron with more attention.

Yes. There can be no doubt about the matter. The indentations on the bar of iron are the marks of teeth! What jaws must the owner of such molars be possessed of! Have we, then, come upon a monster of unknown species, which still exists within the vast waste of waters—a monster more voracious than a shark, more terrible and bulky than the whale. I am unable to withdraw my eyes, from the bar of iron, actually half crushed!

Is, then, my dream about to come true—a dread and terrible reality?

All day my thoughts were bent upon these speculations, and my imagination scarcely regained a degree of calmness and power of reflection until after a sleep of many hours.

This day, as on other Sundays, we observed as a day of rest and pious meditation.

Monday, August 17th. I have been trying to realize from memory the particular instincts of those antediluvian

animals of the secondary period, which succeeding to the mollusca, to the crustacea, and to the fish, preceded the appearance of the race of mammifers. The generation of reptiles then reigned supreme upon the earth. These hideous monsters ruled everything in the seas of the secondary period, which formed the strata of which the Jura mountains are composed. Nature has endowed them with perfect organization. What a gigantic structure was theirs; what vast and prodigious strength they possessed!

The existing Saurians, which include all such reptiles as lizards, crocodiles, and alligators, even the largest and most formidable of their class, are but feeble imitations of their mighty sires, the animals of ages long ago. If there were giants in the days of old, there were also gigantic animals.

I shuddered as I evolved from my mind the idea and recollection of these awful monsters. No eye of man had seen them in the flesh. They took their walks abroad upon the face of the earth thousands of ages before man came into existence, and their fossil bones, discovered in the limestone, have allowed us to reconstruct them anatomically, and thus to get some faint idea of their colossal formation.

I recollect once seeing in the great Museum of Hamburg the skeleton of one of these wonderful Saurians. It measured no less than thirty feet from the nose to the tail. Am I, then, an inhabitant of the earth of the present day, destined to find myself face to face with a representative of this antediluvian family? I can scarcely believe it possible; can hardly believe it true. And yet these marks of powerful teeth upon the bar of iron! can there be a doubt from their shape that the bite is the bite of a crocodile?

My eyes stare wildly and with terror upon the subterranean sea. Every moment I expect one of these monsters to rise from its vast cavernous depths.

I fancy that the worthy Professor in some measure shares my notions, if not my fears, for, after an attentive examination of the crowbar, he cast his eyes rapidly over the mighty and mysterious ocean.

"What could possess him to leave the land," I thought, "as if the depth of this water was of any importance to us. No doubt he has disturbed some terrible monster in his watery home, and perhaps we may pay dearly for our temerity."

Anxious to be prepared for the worst, I examined our weapons, and saw that they were in a fit state for use. My uncle looked on at me and nodded his head approvingly. He, too, has noticed what we have to fear.

Already the uplifting of the waters on the surface indicates that something is in motion below. The danger approaches. It comes nearer and nearer. It behooves us to be on the watch.

Tuesday, August 18. Evening came at last, the hour, when the desire for sleep caused our eyelids to be heavy. Night there is not, properly speaking, in this place, any more than there is in summer in the arctic regions. Hans, however, is immovable at the rudder. When he snatches a moment of rest I really cannot say. I take advantage of his vigilance to take some little repose.

But two hours after I was awakened from a heavy sleep by an awful shock. The raft appeared to have struck upon a sunken rock. It was lifted right out of the water by some wondrous and mysterious power, and then started off twenty fathoms distant.

"Eh, what is it?" cried my uncle starting up, "are we shipwrecked, or what?"

Hans raised his hand and pointed to where, about two hundred yards off, a huge black mass was moving up and down. I looked with awe. My worst fears were realized.

"It is a colossal monster!" I cried, clasping my hands.

"Yes," cried the agitated Professor, "and there yonder is a huge sea lizard of terrible size and shape."

"And farther on behold a prodigious crocodile. Look at his hideous jaws, and that row of monstrous teeth. Ha! he has gone."

"A whale! a whale!" shouted the Professor, "I can see her enormous fins. See, see, how she blows air and water!"

Two liquid columns rose to a vast height above the level of the sea, into which they fell with a terrific crash, waking up the echoes of that awful place. We stood still—surprised, stupefied, terror-stricken at the sight of this group of fearful marine monsters, more hideous in the reality than in my dream. They were of supernatural dimensions; the very smallest of the whole party could with ease have crushed our raft and ourselves with a single bite.

Hans seizing the rudder which had flown out of his hand, puts it hard a-weather in order to escape from such dangerous vicinity; but no sooner does he do so, than he finds he is flying from Scylla to Charybdis. To leeward is a turtle about forty feet wide, and a serpent quite as long, with an enormous and hideous head peering from out the waters.

Look which way we will, it is impossible for us to fly. The fearful reptiles advanced upon us; they turned and twisted about the raft with awful rapidity. They formed around our devoted vessel a series of concentric circles. I took up my rifle in desperation. But what effect can a rifle-ball produce upon the armor scales with which the bodies of these horrid monsters are covered?

We remain still and dumb from utter horror. They advance upon us, nearer and nearer. Our fate appears certain, fearful and terrible. On one side the mighty crocodile, on the other the great sea serpent. The rest of the fearful crowd of marine prodigies have plunged beneath the briny waves and disappeared!

I am about at all risks to fire, and try the effect of a shot. Hans, the guide, however, interfered by a sign to check me. The two hideous and ravenous monsters passed within fifty fathoms of the raft, and then made a rush at one another—their fury and rage preventing them from seeing us.

The combat commenced. We distinctly made out every action of the two hideous monsters.

But to my excited imagination the other animals appeared about to take part in the fierce and deadly struggle—the monster, the whale, the lizard, and the turtle. I distinctly saw them every moment. I pointed them out to the Iclander. But he only shook his head.

“Tva,” he said.

“What—two only does he say. Surely he is mistaken,” I cried, in a tone of wonder.

“He is quite right,” replied my uncle coolly and philosophically, examining the terrible duel with his telescope and speaking as if he were in a lecture room.

“How can that be?”

“Yes, it is so. The first of these hideous monsters has the snout of a porpoise, the head of a lizard, the teeth of a crocodile; and it is this that has deceived us. It is the most fearful of all antediluvian reptiles, the world-renowned *Ichthyosaurus* or Great Fish Lizard.”

“And the other?”

“The other is a monstrous serpent, concealed under the hard vaulted shell of the turtle, the terrible enemy of its fearful rival, the *Plesiosaurus*, or Sea Crocodile.”

Hans was quite right. The two monsters only, disturbed the surface of the sea!

At last have mortal eyes gazed upon two reptiles of the great primitive ocean! I see the flaming red eyes of the *Ichthyosaurus*, each as big, or bigger than a man's head. Nature in its infinite wisdom had gifted this wondrous

marine animal with an optical apparatus of extreme power, capable of resisting the pressure of the heavy layers of water which rolled over him in the depth of the ocean where he usually fed. It has by some authors truly been called the whale of the Saurian race, for it is as big and quick in its motions as our king of the seas. This one measures not less than a hundred feet in length, and I can form some idea of his girth, when I see him lift his prodigious tail out of the waters. His jaw is of awful size and strength, and according to the best-informed naturalists, it does not contain less than a hundred and eighty-two teeth.

The other was the mighty Plesiosaurus, a serpent with a cylindrical trunk, with a shorty stumpy tail, with fins like a bank of oars in a Roman galley.

Its whole body covered by a carapace or shell, and its neck, as flexible as that of a swan, rose more than thirty feet above the waves, a tower of animated flesh !

These animals attacked one another with inconceivable fury. Such a combat was never *seen* before by mortal eyes, and to us who did see it, it appeared more like the phantasmagoric creation of a dream than anything else. They raised mountains of water, which dashed in spray over the raft, already tossed to and fro by the waves. Twenty times we seemed on the point of being upset and hurled headlong into the waves. Hideous hisses appeared to shake the gloomy granite roof of that mighty cavern—hisses which carried terror to our hearts. The awful combatants held each other in a tight embrace. I could not make out one from the other. Still the combat could not last for ever; and woe unto us, whichever became the victor.

One hour, two hours, three hours passed away, without any decisive result. The struggle continued with the same deadly tenacity, but without apparent result. The deadly opponents now approached, now drew away from the raft.

Once or twice we fancied they were about to leave us altogether, but instead of that, they came nearer and nearer.

We crouched on the raft ready to fire at them at a moment's notice, poor as the prospect of hurting or terrifying them was. Still we were determined not to perish without a struggle.

Suddenly the Ichthyosaurus and the Plesiosaurus disappeared beneath the waves, leaving behind them a maelstrom in the midst of the sea. We were very nearly drawn down by the indraught of the water!

Several minutes elapsed before anything was again seen. Was this wonderful combat to end in the depths of the ocean? Was the last act of this terrible drama to take place without spectators?

It was impossible for us to say.

Suddenly, at no great distance from us, an enormous mass rises out of the waters—the head of the great Plesiosaurus. The terrible monster is now wounded unto death. I can see nothing now of his enormous body. All that could be distinguished was his serpent-like neck, which he twisted and curled in all the agonies of death. Now he struck the waters with it as if it had been a gigantic whip, and then again wriggled like a worm cut in two. The water was spurted up to a great distance in all directions. A great portion of it swept over our raft and nearly blinded us. But soon the end of the beast approached nearer and nearer; his movements slackened visibly; his contortions almost ceased; and at last the body of the mighty snake lay an inert, dead mass on the surface of the now calm and placid waters.

As for the Ichthyosaurus, has he gone down to his mighty cavern under the sea to rest, or will he reappear to destroy us?

This question remained unanswered. And we had breathing time.

CHAPTER XXXI.

THE SEA MONSTER.

WEDNESDAY, August 19. Fortunately the wind, which at the present blows with great violence, has allowed us to escape from the scene of the unparalleled and extraordinary struggle. Hans with his usual imperturbable calm remained at the helm. My uncle, who for a short time had been withdrawn from his absorbing reverie by the novel incidents of this sea-fight, fell back again apparently into a brown study. All this time, however, his eyes were fixed impatiently on the wide-spread ocean.

Our voyage now became monotonous and uniform. Dull as it has become, I have no desire to have it broken by any repetition of the perils and adventures of yesterday.

Thursday, August 20. The wind is now N. N. E., and blows very irregularly. It has changed to fitful gusts. The temperature is exceedingly high. We are now progressing at the average rate of about ten miles and a half per hour.

About twelve o'clock a distant sound as of thunder fell upon our ears. I make a note of the fact without even venturing a suggestion as to its cause. It was one continued roar as of a sea falling over mighty rocks.

"Far off in the distance," said the Professor dogmatically, "there is some rock or some island against which the sea, lashed to fury by the wind, is breaking violently."

Hans, without saying a word, clambered to the top of the mast, but could make out nothing. The ocean was level in every direction as far as the eye could reach.

Three hours passed away without any sign to indicate what might be before us. The sound began to assume that of a mighty cataract.

I expressed my opinion on this point strongly to my uncle. He merely shook his head. I, however, am strongly impressed by a conviction that I am not wrong. Are we advancing towards some mighty waterfall which shall cast us into the abyss? Probably this mode of descending into the abyss may be agreeable to the Professor, because it would be something like the vertical descent he is so eager to make. I entertain a very different opinion.

Whatever be the truth, it is certain that not many leagues distant there must be some very extraordinary phenomenon, for as we advance the roar becomes something mighty and stupendous. Is it in the water, or in the air?

I cast hasty glances aloft at the suspended vapors, and I seek to penetrate their mighty depths. But the vault above is tranquil. The clouds, which are now elevated to the very summit, appear utterly still and motionless, and completely lost in the irradiation of electric light. It is necessary, therefore, to seek for the cause of this phenomenon elsewhere.

I examine the horizon, now perfectly calm, pure and free from all haze. Its aspect still remains unchanged. But if this awful noise proceeds from a cataract—if, so to speak in plain English, this vast interior ocean is precipitated into a lower basin—if these tremendous roars are produced by the noise of falling waters, the current would increase in activity, and its increasing swiftness would give me some idea of the extent of the peril with which we are menaced. I consult the current. It simply does not exist: there is no such thing. An empty bottle cast into the water lies to leeward without motion.

About four o'clock Hans rises, clambers up the mast and reaches the truck itself. From this elevated position his looks are cast around. They take in a vast circumference of the ocean. At last, his eyes remain fixed. His face expresses no astonishment, but his eyes slightly dilate.



A MAJESTIC GEYSER. THE GEYSER OF THE CENTRAL SEA.

"He has seen something at last," cried my uncle.

"I think so," I replied.

Hans came down, stood beside us and pointed with his right hand to the south.

"Der nere," he said.

"There," replied my uncle.

And seizing his telescope he looked at it with great attention for about a minute, which to me appeared an age. I knew not what to think or expect.

"Yes, yes," he cried in a tone of considerable surprise, "there it is."

"What?" I asked.

"A tremendous spurt of water rising out of the waves."

"Some other marine monster," I cried, already alarmed.

"Perhaps."

"Then let us steer more to the westward, for we know what we have to expect from antediluvian animals," was my eager reply.

"Go ahead," said my uncle.

I turned towards Hans. Hans was at the tiller steering with his usual imperturbable calm.

Nevertheless, if from the distance which separated us from this creature, a distance which must be estimated at not less than a dozen leagues, and this spurting of water proceeded from the pranks of some antediluvian animal, his dimensions must be something preternatural. To fly is, therefore, the course to be suggested by ordinary prudence. But we have not come into that part of the world to be prudent. Such is my uncle's determination.

We, accordingly, continued to advance. The nearer we come, the loftier is the spouting water. What monster can fill himself with such huge volumes of water, and then unceasingly spout them out in such lofty jets?

At eight o'clock in the evening, reckoning as above ground, where there is day and night, we are not more

than two leagues from the mighty beast. Its long, black, enormous, mountainous body, lies on the top of the water like an island. But then sailors have been said to have gone ashore on sleeping whales, mistaking them for land. Is it illusion, or is it fear? Its length cannot be less than a thousand fathoms. What, then, is this cetaceous monster of which no Cuvier ever thought?

It is quite motionless and presents the appearance of sleep. The sea seems unable to lift him upwards; it is rather the waves which break on his huge and gigantic frame. The water-spout, rising to a height of five hundred feet, breaks in spray with a dull, sullen roar.

We advance, like senseless lunatics, towards this mighty mass.

I honestly confess that I was abjectly afraid. I declared that I would go no farther. I threatened in my terror to cut the sheet of the sail. I attacked the Professor with considerable acrimony, calling him foolhardy, mad, I know not what. He made no answer.

Suddenly the imperturbable Hans once more pointed his finger to the menacing object.

“*Holme!*”

“An island!” cried my uncle.

“An island?” I replied, shrugging my shoulders at this poor attempt at deception.

“Of course it is,” cried my uncle, bursting into a loud and joyous laugh.

“But the water spout?”

“Geyser,” said Hans.

“Yes, of course—a geyser,” replied my uncle, still laughing, “a geyser like those common in Iceland. Jets like this are the great wonders of the country.”

At first I would not allow that I had been so grossly deceived. What could be more ridiculous than to have taken an island for a marine monster? But kick as one

may, one must yield to evidence, and I was finally convinced of my error. It was nothing, after all, but a natural phenomenon.

As we approached nearer and nearer, the dimensions of the liquid sheaf of waters became truly grand and stupendous. The island had, at a distance, presented the appearance of an enormous whale, whose head rose high above the waters. The geyser, a word the Icelanders pronounce *geysir*, and which signifies fury, rose majestically from its summit. Dull detonations are heard every now and then, and the enormous jet, taken as it were with sudden fury, shakes its plume of vapor, and bounds into the first layer of the clouds. It is alone. Neither spurts of vapor nor hot springs surround it, and the whole volcanic power of that region is concentrated in one sublime column. The rays of electric light mix with this dazzling sheaf, every drop as it falls assuming the prismatic colors of the rainbow.

"Let us go on shore," said the Professor, after some minutes of silence.

It is necessary, however, to take great precaution, in order to avoid the weight of falling waters, which would cause the raft to founder in an instant. Hans, however, steers admirably, and brings us to the other extremity of the island.

I was the first to leap on the rock. My uncle followed, while the eider-duck hunter remained still, like a man above any childish sources of astonishment. We were now walking on granite mixed with silicious sandstone; the soil shivered under our feet like the sides of boilers in which over-heated steam is forcibly confined. It is burning. We soon came in sight of the little central basin from which rose the geyser. I plunged a thermometer into the water which ran bubbling from the centre, and it marked a heat of a hundred and sixty-three degrees!

This water, therefore, came from some place where the heat was intense. This was singularly in contradiction with the theories of Professor Hardwigg. I could not help telling him my opinion on the subject.

"Well," said he sharply, "and what does this prove against my doctrine?"

"Nothing," replied I drily, seeing that I was running my head against a foregone conclusion.

Nevertheless, I am compelled to confess that until now we have been most remarkably fortunate, and that this voyage is being accomplished in most favorable conditions of temperature; but it appears evident, in fact, certain, that we shall sooner or later arrive at one of those regions, where the central heat will reach its utmost limits, and will go far beyond all the possible gradations of thermometers.

Visions of the Hades of the ancients, believed to be in the centre of the earth, floated through my imagination.

We shall, however, see what we shall see. That is the Professor's favorite phrase now. Having christened the volcanic island by the name of his nephew, the leader of the expedition turned away and gave the signal for embarkation.

I stood still, however, for some minutes, gazing upon the magnificent geyser. I soon was able to perceive that the upward tendency of the water was irregular; now it diminished in intensity, and then, suddenly it regained new vigor, which I attributed to the variation of the pressure of the accumulated vapors in its reservoir.

At last we took our departure, going carefully round the projecting, and rather dangerous, rocks of the southern side. Hans had taken advantage of this brief halt to repair the raft. Not before it was required.

Before we took our final departure from the island, however, I made some observations to calculate the distance

we had gone over, and I put them down in my Journal. Since we left Port Gretchen, we had travelled two hundred and seventy leagues—more than eight hundred miles—on this great inland sea; we were, therefore, six hundred and twenty leagues from Iceland, and exactly under England.

CHAPTER XXXII.

THE BATTLE OF THE ELEMENTS.

FRIDAY, August 21st. This morning the magnificent geyser had wholly disappeared. The wind had freshened up, and we were fast leaving the neighbourhood of Henry's Island. Even the roaring sound of the mighty column was lost to the ear.

The weather, if, under the circumstances, we may use such an expression, is about to change very suddenly. The atmosphere is being gradually loaded with vapors, which carry with them the electricity formed by the constant evaporation of the saline waters; the clouds are slowly but sensibly falling towards the sea, and are assuming a dark olive texture; the electric rays can scarcely pierce through the opaque curtain which has fallen like a drop-scene before this wondrous theatre, on the stage of which another and terrible drama is soon to be enacted. This time it is no fight of animals; it is the fearful battle of the elements.

I feel that I am very peculiarly influenced, as all creatures are on land when a deluge is about to take place.

The cumuli, a perfectly oval kind of cloud, piled upon the south, presented a most awful and sinister appearance; with the pitiless aspect often seen before a storm. The air is extremely heavy; the sea is comparatively calm.

In the distance, the clouds have assumed the appearance of enormous balls of cotton, or rather pods, piled one above the other in picturesque confusion. By degrees, they appear to swell out, break, and gain in number what they lose in grandeur; their heaviness is so great that they are unable to lift themselves from the horizon; but under

the influence of the upper currents of air, they are gradually broken up, become much darker, and then present the appearance of one single layer of a formidable character; now and then a lighter cloud, still lit up from above, rebounds upon this grey carpet, and is lost in the opaque mass.

There can be no doubt that the entire atmosphere is saturated with electric fluid; I am myself wholly impregnated; my hairs literally stand on end as if under the influence of a galvanic battery. If one of my companions ventured to touch me, I think he would receive rather a violent and unpleasant shock.

About ten o'clock in the morning, the symptoms of the storm became more thorough and decisive; the wind appeared to soften down as if to take breath for a renewed attack; the vast funereal pall above us looked like a huge bag—like the cave of Æolus, in which the storm was collecting its forces for the attack.

I tried all I could not to believe in the menacing signs of the sky, and yet I could not avoid saying, as it were involuntarily—

“I believe we are going to have bad weather.”

The Professor made me no answer. He was in a horrible, in a detestable humor—to see the ocean stretching interminably before his eyes. On hearing my words he simply shrugged his shoulders.

“We shall have a tremendous storm,” I said again, pointing to the horizon. “These clouds are falling lower and lower upon the sea, as if to crush it.”

A great silence prevailed. The wind wholly ceased. Nature assumed a dead calm, and ceased to breathe. Upon the mast, where I noticed a sort of slight *ignis fatuus*, the sail hangs in loose heavy folds. The raft is motionless in the midst of a dark heavy sea—without undulation, without motion. It is as still as glass. But as we are

making no progress, what is the use of keeping up the sail, which may be the cause of our perdition if the tempest should suddenly strike us without warning.

"Let us lower the sail," I said, "it is only an act of common prudence."

"No—no," cried my uncle, in an exasperated tone, "a hundred times, no. Let the wind strike us and do its worst, let the storm sweep us away where it will—only let me see the glimmer of some coast—of some rocky cliffs, even if they dash our raft into a thousand pieces. No! keep up the sail—no matter what happens."

These words were scarcely uttered, when the southern horizon underwent a sudden and violent change. The long accumulated vapors were resolved into water, and the air required to fill up the void produced became a wild and raging tempest.

It came from the most distant corners of the mighty cavern. It raged from every point of the compass. It roared; it yelled; it shrieked with glee as of demons let loose. The darkness increased and became indeed darkness visible.

The raft rose and fell with the storm, and bounded over the waves. My uncle was cast headlong upon the deck. I with great difficulty dragged myself towards him. He was holding on with might and main to the end of a cable, and appeared to gaze with pleasure and delight at the spectacle of the unchained elements.

Hans never moved a muscle. His long hair driven hither and thither by the tempest and scattered wildly over his motionless face, gave him a most extraordinary appearance—for every single hair was illuminated by little sparkling sprigs.

His countenance presents the extraordinary appearance of an antediluvian man, a true contemporary of the megatherium.

Still the mast holds good against the storm. The sail spreads out and fills like a soap bubble about to burst. The raft rushes on at a pace impossible to estimate, but still less swiftly than the body of water displaced beneath it, the rapidity of which may be seen by the lines which fly right and left in the wake.

"The sail, the sail!" I cried, making a trumpet of my hands, and then endeavoring to lower it.

"Let it alone!" said my uncle, more exasperated than ever.

"*Nej*," said Hans, gently shaking his head.

Nevertheless, the rain formed a roaring cataract before this horizon of which we were in search, and to which we were rushing like madmen.

But before this wilderness of waters reached us, the mighty veil of cloud was torn in twain; the sea began to foam wildly; and the electricity, produced by some vast and extraordinary chemical action in the upper layer of cloud, is brought into play. To the fearful claps of thunder are added dazzling flashes of lightning, such as I had never seen. The flashes crossed one another, hurled from every side; while the thunder came pealing like an echo. The mass of vapor becomes incandescent; the hail-stones which strike the metal of our boots and our weapons, are actually luminous; the waves as they rise appear to be fire-eating monsters, beneath which seethes an intense fire, their crests surmounted by combs of flame.

My eyes are dazzled, blinded by the intensity of light, my ears are deafened by the awful roar of the elements. I am compelled to hold on to the mast, which bends like a reed beneath the violence of the storm, to which none ever before seen by mariners bore any resemblance.

* * * * *

Here my travelling notes become very incomplete, loose and vague. I have only been able to make out one or

two fugitive observations, dotted down in a mere mechanical way. But even their brevity, even their obscurity, show the emotions which overcame me.

* * * * *

Sunday, August 23d. Where have we got to? In what region are we wandering? We are still carried forward with inconceivable rapidity.

The night has been fearful, something not to be described. The storm shows no signs of cessation. We exist in the midst of an uproar which has no name. The detonations as of artillery are incessant. Our ears literally bleed. We are unable to exchange a word, or hear each other speak.

The lightning never ceases to flash for a single instant. I can see the zigzags after a rapid dart, strike the arched roof of this mightiest of mighty vaults. If it were to give way and fall upon us! Other lightnings plunge their forked streaks in every direction, and take the form of globes of fire, which explode like bomb-shells over a beleaguered city. The general crash and roar do not apparently increase; it has already gone far beyond what human ear can appreciate. If all the powder-magazines in the world were to explode together, it would be impossible for us to hear worse noise.

There is a constant emission of light from the storm-clouds; the electric matter is incessantly released; evidently the gaseous principles of the air are out of order; innumerable columns of water rush up like waterspouts, and fall back upon the surface of the ocean in foam.

Whither are we going? My uncle still lies at full length upon the raft, without speaking—without taking any note of time.

The heat increases. I look at the thermometer, to my surprise it indicates—*The exact figure is here rubbed out in my manuscript.*

Monday, August 24. This terrible storm will never end. Why should not this state of the atmosphere, so dense and murky, once modified, again remain definitive?

We are utterly broken and harassed by fatigue. Hans remains just as usual. The raft runs to the south-east invariably. We have now already run two hundred leagues from the newly-discovered island.

About twelve o'clock the storm became worse than ever. We are obliged now to fasten every bit of cargo tightly on the deck of the raft, or everything would be swept away. We tie ourselves to the mast, each man lashing the other. The waves drive over us, so that several times we are actually under water.

We had been under the painful necessity of abstaining from speech for three days and three nights. We opened our mouths, we moved our lips, but no sound came. Even when we placed our mouths to each other's ears it was the same.

The wind carried the voice away.

My uncle once contrived to get his head close to mine after several almost vain endeavors. He appeared to my nearly exhausted senses to articulate some word. I had a notion, more from intuition than anything else, that he said to me, "we are lost."

I took out my note book, from which under the most desperate circumstances I never parted, and wrote a few words as legibly as I could——

"Take in sail."

With a deep sigh he nodded his head and acquiesced.

His head had scarcely time to fall back in the position from which he had momentarily raised it, than a disc or ball of fire appeared on the very edge of the raft—our devoted, our doomed craft. The mast and sail are carried away bodily, and I see them swept away to a prodigious height like a kite.

We were frozen, actually shivered with terror. The ball of fire, half white, half azure-colored, about the size of a ten-inch bomb-shell, moved along, turning with prodigious rapidity to leeward of the storm. It ran about here, there and everywhere, it clambered up one of the bulwarks of the raft, it leaped upon the sack of provisions, and then finally descended lightly, fell like a foot ball and landed on our powder barrel.

Horrible situation. An explosion of course was now inevitable.

By heaven's mercy, it is not so.

The dazzling disc moves on one side, it approaches Hans, who looked at it with singular fixity; then it approached my uncle, who cast himself on his knees to avoid it; it came towards me, as I stood pale and shuddering in the dazzling light and heat; it pirouetted round my feet, which I endeavored to withdraw.

An odor of nitrous gas filled the whole air; it penetrated to the throat, to the lungs. I felt ready to choke.

Why is it that I cannot withdraw my feet? Are they riveted to the flooring of the raft?

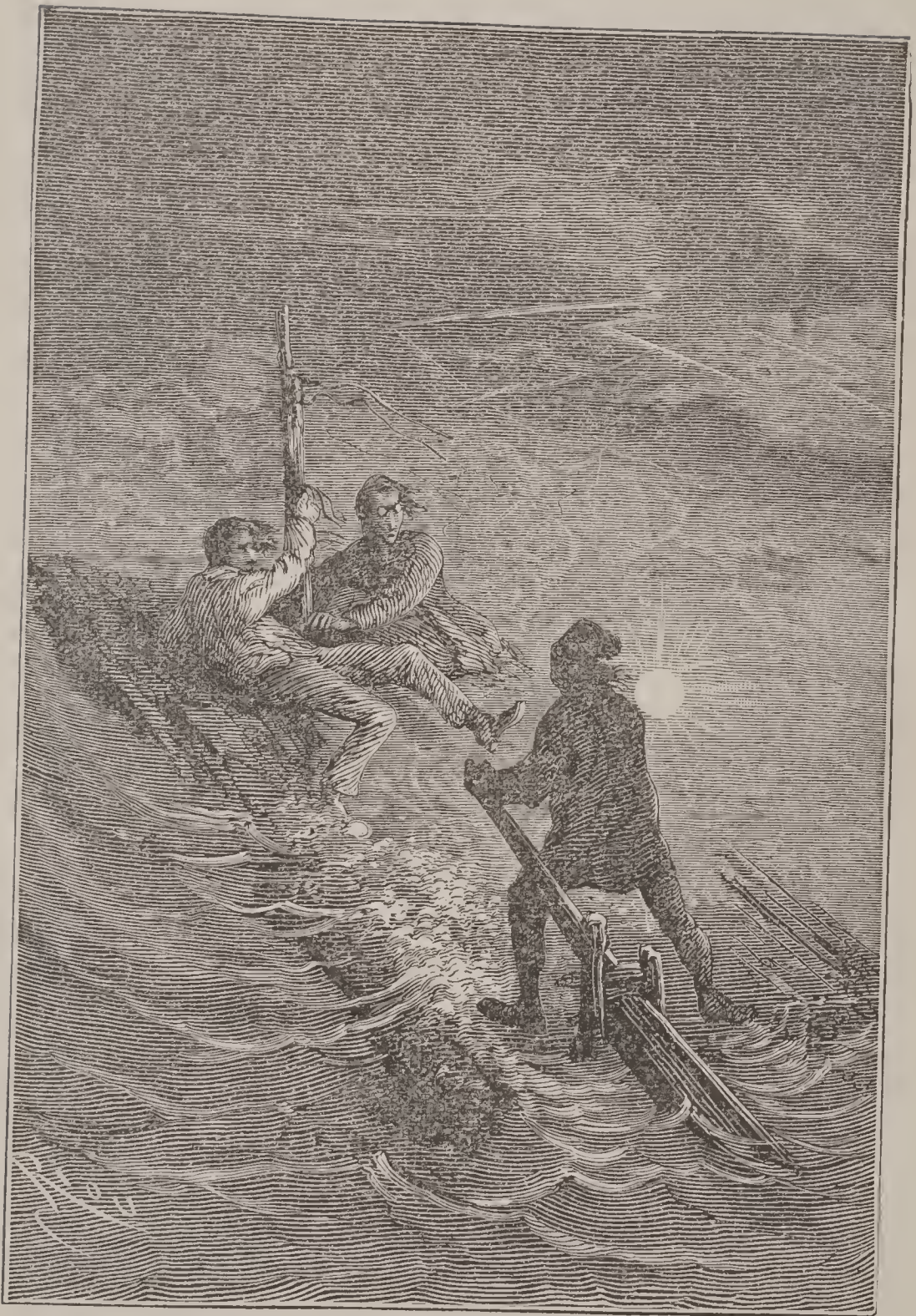
No.

The fall of the electric globe has turned all the iron on board into loadstones—the instruments, the tools, the arms are clanging together with awful and horrible noise; the nails of my heavy boots adhere closely to the plate of iron incrustated in the wood. I cannot withdraw my foot.

It is the old story over again of the mountain of adamant.

At last, by a violent and almost superhuman effort, I tear it away just as the ball which is still executing its gyratory motions is about to run round it and drag me with it—if—

O what intense stupendous light! The globe of fire bursts—we are enveloped in cascades of living fire, which flood the space around with luminous matter.



THE BALL OF FIRE.

Then all went out and darkness once more fell upon the deep! I had just time to see my uncle once more cast apparently senseless on the flooring of the raft, Hans at the helm, "spitting fire" under the influence of the electricity which seemed to have gone through him.

Whither are we going, I ask? and echo answers, Whither?

Tuesday, August 25. I have just come out of a long fainting fit. The awful and hideous storm still continues; the lightning has increased in vividness, and pours out its fiery wrath like a brood of serpents let loose in the atmosphere.

Are we still upon the sea? Yes, and being carried along with incredible velocity.

We have passed under England, under the Channel, under France, probably under the whole extent of Europe.

* * * * *

Another awful clamor in the distance. This time it is certain that the sea is breaking upon the rocks at no great distance. Then——

CHAPTER XXXIII.

OUR ROUTE REVERSED.

HERE ends what I call My Journal of our voyage on board the raft, which Journal was happily saved from the wreck. I proceed with my narrative as I did before I commenced my daily notes.

What happened when the terrible shock took place, when the raft was cast upon the rocky shore, it would be impossible for me now to say. I felt myself precipitated violently into the boiling waves, and if I escaped from a certain and cruel death, it was wholly owing to the determination of the faithful Hans, who clutching me by the arm, saved me from the yawning abyss.

The courageous Iclander then carried me in his powerful arms, far out of the reach of the waves, and laid me down upon a burning expanse of sand, where I found myself some time afterwards in the company of my uncle the Professor.

Then he quietly returned towards the fatal rocks, against which the furious waves were beating, in order to save any stray waifs from the wreck. This man was always practical and thoughtful. I could not utter a word; I was quite overcome with emotion; my whole body was broken and bruised with fatigue; it took hours before I was anything like myself.

Meanwhile, there fell a fearful deluge of rain, drenching us to the skin. Its very violence, however, proclaimed the approaching end of the storm. Some overhanging rocks, afforded us a slight protection from the torrents.

Under this shelter, Hans prepared some food, which,

however, I was unable to touch; and, exhausted by the three weary days and nights of watching, we fell into a deep and painful sleep. My dreams were fearful, but at last exhausted nature asserted her supremacy, and I slumbered.

Next day when I awoke the change was magical. The weather was magnificent. Air and sea, as if by mutual consent, had regained their serenity. Every trace of the storm, even the faintest, had disappeared. I was saluted on my awakening by the first joyous tones I had heard from the Professor for many a day. His gaiety, indeed, was something terrible.

“Well, my lad,” he cried, rubbing his hands together, “have you slept soundly?”

Might it not have been supposed that we were in the old house on the Königstrasse; that I had just come down quietly to my breakfast, and that my marriage with Gretchen was to take place that very day? My uncle’s coolness was exasperating.

Alas, considering how the tempest had driven us in an easterly direction, we had passed under the whole of Germany, under the city of Hamburg where I had been so happy, under the very street which contained all I loved and cared for in the world.

It was a positive fact that I was only separated from her by a distance of forty leagues. But these forty leagues were of hard impenetrable granite!

All these dreary and miserable reflections passed through my mind, before I attempted to answer my uncle’s question.

“Why, what is the matter?” he cried, “cannot you say whether you have slept well or not?”

“I have slept very well,” was my reply, “but every bone in my body aches. I suppose that will lead to nothing.”

"Nothing at all, my boy. It is only the result of the fatigue of the last few days—that is all."

"You appear—if I may be allowed to say so—to be very jolly this morning," I said.

"Delighted, my dear boy, delighted. Was never happier in my life. We have at last reached the wished-for port."

"The end of our expedition?" cried I, in a tone of considerable surprise.

"No; but to the confines of that sea which I began to fear would never end, but go round the whole world. We will now tranquilly resume our journey by land, and once again endeavor to dive into the centre of the Earth."

"My dear uncle," I began, in a hesitating kind of way, "allow me to ask you one question?"

"Certainly, Harry; a dozen if you think proper."

"One will suffice. How about getting back?" I asked.

"How about getting back? What a question to ask. We have not as yet reached the end of our journey."

"I know that. All I want to know is, how you propose we shall manage the return voyage?"

"In the most simple manner in the world," said the imperturbable Professor. "Once we reach the exact centre of this sphere, either we shall find a new road by which to ascend to the surface, or we shall simply turn round and go back by the way we came. I have every reason to believe that while we are travelling forward, it will not close behind us."

"Then one of the first matters to see to will be to repair the raft," was my rather melancholy response.

"Of course. We must attend to that above all things," continued the Professor.

"Then comes the all-important question of provisions," I urged. "Have we anything like enough left to enable us to accomplish such great, such amazing, designs as you contemplate carrying out?"

"I have seen into the matter, and my answer is in the affirmative. Hans is a very clever fellow, and I have reason to believe that he has saved the greater part of the cargo. But the best way to satisfy your scruples, is to come and judge for yourself."

Saying which, he led the way out of the kind of open grotto in which we had taken shelter. I had almost begun to hope that which I should rather have feared, and this was the impossibility of such a shipwreck leaving even the slightest signs of what it had carried as freight. I was, however, thoroughly mistaken.

As soon as I reached the shores of this inland sea, I found Hans standing gravely in the midst of a large number of things laid out in complete order. My uncle wrung his hands with deep and silent gratitude. His heart was too full for speech.

This man, whose superhuman devotion to his employers, I not only never saw surpassed, nor even equalled, had been hard at work all the time we slept, and at the risk of his life had succeeded in saving the most precious articles of our cargo.

Of course, under the circumstances, we necessarily experienced several severe losses. Our weapons had wholly vanished. But experience had taught us to do without them. The provision of powder had, however, remained intact, after having narrowly escaped blowing us all to atoms in the storm.

"Well," said the Professor, who was now ready to make the best of everything, "as we have no guns, all we have to do is to give up all idea of hunting."

"Yes, my dear sir, we can do without them, but what about all our instruments?"

"Here is the manometer, the most useful of all, and which I gladly accept in lieu of the rest. With it alone I can calculate the depth as we proceed; by its means alone

I shall be able to decide when we have reached the centre of the earth. Ha, ha! but for this little instrument we might make a mistake, and run the risk of coming out at the antipodes!"

All this was said amid bursts of unnatural laughter.

"But the compass," I cried, "without that what can we do?"

"Here it is safe and sound!" he cried, with real joy, "ah, ah, and here we have the chronometer and the thermometers. Hans the hunter is indeed an invaluable man!"

It was impossible to deny this fact. As far as the nautical and other instruments were concerned, nothing was wanting. Then on further examination, I found ladders, cords, pickaxes, crowbars, and shovels, all scattered about on the shore.

There was, however, finally the most important question of all, and that was, provisions.

"But what are we to do for food?" I asked.

"Let us see to the commissariat department," replied my uncle gravely.

The boxes which contained our supply of food for the voyage were placed in a row along the strand, and were in a capital state of preservation; the sea had in every case respected their contents, and to sum up in one sentence, taking into consideration, biscuits, salt meat, schiedam and dried fish, we could still calculate on having about four months' supply, if used with prudence and caution.

"Four months," cried the sanguine Professor, in high glee, "then we shall have plenty of time both to go and to come, and with what remains I undertake to give a grand dinner to my colleagues of the Johanneum."

I sighed. I should by this time have used myself to the temperament of my uncle, and yet this man astonished me more and more every day. He was the greatest human enigma I ever had known.

"Now," said he, "before we do anything else we must lay in a stock of fresh water. The rain has fallen in abundance, and filled the hollows of the granite. There is a rich supply of water, and we have no fear of suffering from thirst, which in our circumstances is of the last importance. As for the raft, I shall recommend Hans to repair it to the best of his abilities; though I have every reason to believe we shall not require it again."

"How is that?" I cried, more amazed than ever at my uncle's style of reasoning.

"I have an idea, my dear boy; it is none other than this simple fact: we shall not come out by the same opening as that by which we entered."

I began to look at my uncle with vague suspicion. An idea had more than once taken possession of me; and this was, that he was going mad. And yet, little did I think how true and prophetic his words were doomed to be.

"And now," he said, "having seen to all these matters of detail, to breakfast."

I followed him to a sort of projecting cape, after he had given his last instructions to our guide. In this original position, with dried meat, biscuit, and a delicious cup of tea, we made a satisfactory meal—I may say one of the most welcome and pleasant I ever remember. Exhaustion, the keen atmosphere, the state of calm after so much agitation, all contributed to give me an excellent appetite. Indeed, it contributed very much to producing a pleasant and cheerful state of mind.

While breakfast was in hand, and between the sips of warm tea, I asked my uncle if he had any idea of how we now stood in relation to the world above.

"For my part," I added, "I think it will be rather difficult to determine."

"Well, if we were compelled to fix the exact spot," said my uncle, "it might be difficult, since during the three

days of that awful tempest I could keep no account either of the quickness of our pace, or of the direction in which the raft was going. Still, we will endeavor to approximate to the truth. We shall not, I believe, be so very far out."

"Well, if I recollect rightly," I replied, "our last observation was made at the Geyser island."

"Harry's Island, my boy! Harry's Island. Do not decline the honor of having named it; given your name to an island discovered by us, the first human beings who trod it since the creation of the world!"

"Let it be so, then. At Harry's Island we had already gone over two hundred and seventy leagues of sea, and we were, I believe, about six hundred leagues, more or less from Iceland."

"Good. I am glad to see that you remember so well. Let us start from that point, and let us count four days of storm, during which our rate of travelling must have been very great. I should say that our velocity must have been about eighty leagues to the twenty-four hours."

I agreed that I thought this a fair calculation. There were then three hundred leagues to be added to the grand total.

"Yes, and the Central Sea must extend at least six hundred leagues from side to side. Do you know, my boy, Harry, that we have discovered an inland lake larger than the Mediterranean?"

"Certainly, and we only know of its extent in one way. It may be hundreds of miles in length."

"Very likely."

"Then," said I, after calculating for some minutes, "if your previsions are right, we are at this moment exactly under the Mediterranean itself."

"Do you think so?"

"Yes, I am almost certain of it. Are we not nine hundred leagues distant from Reykjawik?"

“That is perfectly true, and a famous bit of road we have travelled, my boy. But why we should be under the Mediterranean more than under Turkey or the Atlantic Ocean can only be known when we are sure of not having deviated from our course; and of this we know nothing.”

“I do not think we were driven very far from our course: the wind appears to me to have been always about the same. My opinion is that this shore must be situated to the southeast of Port Gretchen.”

“Good—I hope so. It will, however, be easy to decide the matter by taking the bearings from our departure by means of the compass. Come along, and we will consult that invaluable invention.”

The Professor now walked eagerly in the direction of the rock where the indefatigable Hans had placed the instruments in safety. My uncle was gay and light-hearted; he rubbed his hands, and assumed all sorts of attitudes. He was to all appearance once more a young man. Since I had known him never had he been so amiable and pleasant. I followed him, rather curious to know whether I had made any mistake in my estimation of our position.

As soon as we had reached the rock, my uncle took the compass, placed it horizontally before him and looked keenly at the needle.

As he had at first shaken it to give it vivacity, it oscillated considerably, and then slowly assumed its right position under the influence of the magnetic power.

The Professor bent his eyes curiously over the wondrous instrument. A violent start immediately showed the extent of his emotion.

He closed his eyes, rubbed them, and took another and a keener survey.

Then he turned slowly round to me, stupefaction depicted on his countenance.

“What is the matter?” said I, beginning to be alarmed.

He could not speak. He was too overwhelmed for words. He simply pointed to the instrument.

I examined it eagerly according to his mute directions, and a loud cry of surprise escaped my lips. The needle of the compass pointed due north, in the direction we expected was the south !

It pointed to the shore instead of to the high seas.

I shook the compass ; I examined it with a curious and anxious eye. It was in a state of perfection. No blemish in any way explained the phenomenon. Whatever position we forced the needle into, it returned invariably to the same unexpected point.

It was useless attempting to conceal from ourselves the fatal truth.

There could be no doubt about it, unwelcome as was the fact, that during the tempest, there had been a sudden slant of wind, of which we had been unable to take any account, and thus the raft had carried us back to the shores we had left, apparently for ever, so many days before !

CHAPTER XXXIV.

A VOYAGE OF DISCOVERY.

It would be altogether impossible for me to give any idea of the utter astonishment which overcame the Professor on making this extraordinary discovery. Amaze-ment, incredulity, and rage were blended in such a way as to alarm me.

During the whole course of my life I had never seen a man at first so chapfallen ; and then so furiously indignant.

The terrible fatigues of our sea voyage, the fearful dangers we had passed through, had all, all, gone for nothing. We had to begin them all over again.

Instead of progressing, as we fondly expected, during a voyage of so many days, we had retreated. Every hour of our expedition on the raft had been so much lost time!

Presently, however, the indomitable energy of my uncle overcame every other consideration.

"So," he said, between his set teeth, "fatality will play me these terrible tricks. The elements themselves conspire to overwhelm me with mortification. Air, fire, and water combine their united efforts to oppose my passage. Well, they shall see what the earnest will of a determined man can do. I will not yield, I will not retreat even one inch ; and we shall see who shall triumph in this great contest—man or nature."

Standing upright on a rock, irritated and menacing, Professor Hardwigg, like the ferocious Ajax, seemed to defy the fates. I, however, took upon myself to interfere, and to impose some sort of check upon such insensate enthusiasm.

"Listen to me, uncle," I said, in a firm but temperate tone of voice, "there must be some limit to ambition here below. It is utterly useless to struggle against the impossible. Pray listen to reason. We are utterly unprepared for a sea voyage; it is simple madness to think of performing a journey of five hundred leagues upon a wretched pile of beams, with a counterpane for a sail, a paltry stick for a mast, and a tempest to contend with. As we are totally incapable of steering our frail craft, we shall become the mere plaything of the storm, and it is acting the part of madmen if we, a second time, run any risk upon this dangerous and treacherous Central Sea."

These are only a few of the reasons and arguments I put together—reasons and arguments which to me appeared unanswerable. I was allowed to go on without interruption for about ten minutes. The explanation to this I soon discovered. The Professor was not even listening, and did not hear a word of all my eloquence.

"To the raft!" he cried, in a hoarse voice, when I paused for a reply.

Such was the result of my strenuous effort to resist his iron will. I tried again; I begged and implored him; I got into a passion; but I had to deal with a will more determined than my own. I seemed to feel like the waves which fought and battled against the huge mass of granite at our feet, which had smiled grimly for so many ages at their puny efforts.

Hans, meanwhile, without taking part in our discussion, had been repairing the raft. One would have supposed that he instinctively guessed at the further projects of my uncle.

By means of some fragments of cordage, he had again made the raft sea-worthy.

While I had been speaking he had hoisted a new mast and sail, the latter already fluttering and waving in the breeze.

The worthy Professor spoke a few words to our imperturbable guide, who immediately began to put our baggage on board, and to prepare for our departure. The atmosphere was now tolerably clear and pure, and the north-east wind blew steadily and serenely. It appeared likely to last for some time.

What, then, could I do? Could I undertake to resist the iron will of two men? It was simply impossible; if even I could have hoped for the support of Hans. This, however, was out of the question. It appeared to me that the Iclander had set aside all personal will and identity. He was a picture of abnegation.

I could hope for nothing from one so infatuated with and devoted to his master. All I could do, therefore, was to swim with the stream.

In a mood of stolid and sullen resignation, I was about to take my accustomed place on the raft, when my uncle placed his hand upon my shoulder.

"There is no hurry, my boy," he said, "we shall not start until to-morrow."

I looked the picture of resignation to the dire will of fate.

"Under the circumstances," he said, "I ought to neglect no precautions. As fate has cast me upon these shores, I shall not leave without having completely examined them."

In order to understand this remark, I must explain that though we had been driven back to the northern shore, we had landed at a very different spot from that which had been our starting point.

Port Gretchen must, we calculated, be very much to the westward. Nothing, therefore, was more natural and reasonable than that we should reconnoitre this new shore upon which we had so unexpectedly landed.

"Let us go on a journey of discovery," I cried.

And leaving Hans to his important operation, we started on our expedition. The distance between the foreshore at high-water and the foot of the rocks was considerable. It would take about half-an-hour's walking to get from one to the other.

As we trudged along, our feet crushed innumerable shells of every shape and size—once the dwelling-place of animals of every period of creation.

I particularly noticed some enormous shells—carapaces (turtle and tortoise species) the diameter of which exceeded fifteen feet.

They had in past ages belonged to those gigantic glyptodons of the pliocene period, of which the modern turtle is but a minute specimen. In addition, the whole soil was covered by a vast quantity of stony relics, having the appearance of flints worn by the action of the waves, and lying in successive layers one above the other. I came to the conclusion that in past ages the sea must have covered the whole district. Upon the scattered rocks, now lying far beyond its reach, the mighty waves of ages had left evident marks of their passage.

On reflection, this appeared to me partially to explain the existence of this remarkable ocean, forty leagues below the surface of the earth's crust. According to my new, and perhaps fanciful, theory, this liquid mass must be gradually lost in the deep bowels of the earth. I had also no doubt that this mysterious sea was fed by infiltration of the ocean above, through imperceptible fissures.

Nevertheless, it was impossible not to admit that these fissures must now be nearly choked up, for if not, the cavern, or rather the immense and stupendous reservoir would have been completely filled in a short space of time. Perhaps even this water, having to contend against the accumulated subterraneous fires of the interior of the earth, had become partially vaporized. Hence the explanation

of those heavy clouds suspended over our heads, and the superabundant display of that electricity which occasioned such terrible storms in this deep and cavernous sea.

This lucid explanation of the phenomena we had witnessed appeared to me quite satisfactory. However great and mighty the marvels of nature may seem to us, they are always to be explained by physical reasons. Everything is subordinate to some great law of nature.

It now appeared clear that we were walking upon a kind of sedimentary soil, formed like all the soils of that period, so frequent on the surface of the globe, by the subsidence of the waters. The Professor, who was now in his element, carefully examined every rocky fissure. Let him only find an opening and it directly became important to him to examine its depth.

For a whole mile we followed the windings of the Central Sea, when suddenly an important change took place in the aspect of the soil. It seemed to have been rudely cast up, convulsionized, as it were, by a violent upheaving of the lower strata. In many places, hollows here, and hillocks there, attested great dislocations at some other period of the terrestrial mass.

We advanced with great difficulty over the broken masses of granite mixed with flint, quartz and alluvial deposits, when a large field, more even than a field, a plain of bones, appeared suddenly before our eyes! It looked like an immense cemetery, where generation after generation had mingled their mortal dust.

Lofty barrows of early remains rose at intervals. They undulated away to the limits of the distant horizon and were lost in a thick and brown fog.

On that spot, some three square miles in extent, was accumulated the whole history of animal life—scarcely one creature upon the comparatively modern soil of the upper and inhabited world had there existed.

Nevertheless, we were drawn forward by an all-absorbing and impatient curiosity. Our feet crushed with a dry and crackling sound the remains of those prehistoric fossils, for which the museums of great cities quarrel, even when they obtain only rare and curious morsels. A thousand such naturalists as Cuvier would not have sufficed to recompose the skeletons of the organic beings which lay in this magnificent osseous collection.

I was utterly confounded. My uncle stood for some minutes with his arms raised on high towards the thick granite vault which served us for a sky. His mouth was wide open; his eyes sparkled wildly behind his spectacles (which he had fortunately saved), his head bobbed up and down and from side to side, while his whole attitude and mien expressed unbounded astonishment.

He stood in the presence of an endless, wondrous and inexhaustibly rich collection of antediluvian monsters, piled up for his own private and peculiar satisfaction.

Fancy an enthusiastic lover of books carried suddenly into the very midst of the famous library of Alexandria burned by the sacrilegious Omar, and which some miracle had restored to its pristine splendor! Such was something of the state of mind in which uncle Hardwigg was now placed.

For some time he stood thus, literally aghast at the magnitude of his discovery.

But it was even a greater excitement when, darting wildly over this mass of organic dust, he caught up a naked skull and addressed me in a quivering voice—

“Harry, my boy—Harry—this is a human head!”

“A human head, uncle!” I said, no less amazed and stupified than himself.

“Yes, nephew. Ah! Mr. Milne-Edwards—ah! Mr. De Quatrefages—why are you not here where I am—I, Professor Hardwigg!”

CHAPTER XXXV.

DISCOVERY UPON DISCOVERY.

IN order fully to understand the exclamation made by my uncle, and his allusions to these illustrious and learned men, it will be necessary to enter into certain explanations in regard to a circumstance of the highest importance to palæontology or the science of fossil life, which had taken place a short time before our departure from the upper regions of the earth.

On the 28th of March, 1863, some navigators under the direction of M. Boucher de Perthes, were at work in the great quarries of Moulin-Quignon, near Abbeville, in the department of the Somme, in France. While at work, they unexpectedly came upon a human jawbone buried fourteen feet below the surface of the soil. It was the first fossil of the kind that had ever been brought to the light of day. Near this unexpected human relic were found stone hatchets and carved flints, colored and clothed by time in one uniform brilliant tint of verdigris.

The report of this extraordinary and unexpected discovery spread not only all over France, but over England and Germany. Many learned men belonging to various scientific bodies, and noteworthy among others, Messrs. Milne-Edwards and De Quatrefages, took the affair very much to heart, demonstrated the incontestable authenticity of the bone in question, and became—to use the phrase then recognized in England—the most ardent supporters of the “jawbone question.”

To the eminent geologists of the United Kingdom who looked upon the fact as certain—Messrs. Falconer, Buck, Carpenter and others—were soon united the learned men

of Germany, and among those in the first rank, the most eager, the most enthusiastic, was my worthy uncle, Professor Hardwigg.

The authenticity of a human fossil of the quaternary period seemed then to be incontestably demonstrated, and even to be admitted by the most skeptical.

This system or theory, call it what you will, had, it is true, a bitter adversary in M. Elie de Beaumont. This learned man, who holds such a high place in the scientific world, holds that the soil of Moulin-Quignon does not belong to the diluvium, but to a much less ancient strata, and, in accordance with Cuvier in this respect, he would by no means admit that the human species was cotemporary with the animals of the quaternary epoch. My worthy uncle, Professor Hardwigg, in concert with the great majority of geologists, had held firm, had disputed, discussed, and finally, after considerable talking and writing, M. Elie de Beaumont had been pretty well left alone in his opinions.

We were familiar with all the details of this discussion, but were far from being aware then that since our departure the matter had entered upon a new phase. Other similar jawbones, though belonging to individuals of varied types and very different natures, had been found in the movable gray sands of certain grottoes in France, Switzerland, and Belgium; together with arms, utensils, tools, bones of children, of men in the prime of life, and of old men. The existence of men in the quaternary period became, therefore, more positive every day.

But this was far from being all. New remains, dug up from the pliocene or tertiary deposits, had enabled the more far-seeing or audacious among learned men to assign even a far greater degree of antiquity to the human race. These remains, it is true, were not those of men; that is, were not the bones of men, but objects decidedly having

served the human race, shin bones, thigh bones of fossil animals, regularly scooped out, and in fact sculptured—bearing the unmistakable signs of human handy-work.

By means of these wondrous and unexpected discoveries, man ascended endless centuries in the scale of time; he, in fact, preceded the mastodon; became the cotemporary of the *elephas meridionalis*—the southern elephant; acquired an antiquity of over a hundred thousand years—since that is the date given by the most eminent geologists to the pliocene period of the earth. Such was then the state of palæontologic science, and what we moreover knew, sufficed to explain our attitude before this great cemetery of the plains of the Hardwigg Ocean.

It will now be easy to understand the Professor's mingled astonishment and joy when, on advancing about twenty yards, he found himself in the presence of, I may say face to face with, a specimen of the human race actually belonging to the quarternary period!

It was indeed a human skull, perfectly recognizable. Had a soil of very peculiar nature, like that of the cemetery of St. Michel at Bordeaux, preserved it during countless ages? This was the question I asked myself, but which I was wholly unable to answer. But this head with stretched and parchmenty skin, with the teeth whole, the hair abundant, was before our eyes as in life!

I stood mute, almost paralyzed with wonder and awe before this dread apparition of another age. My uncle, who on almost every occasion was a great talker, remained for a time completely dumbfounded. He was too full of emotion for speech to be possible. After a while, however, we raised up the body to which the skull belonged. We stood it on end. It seemed, to our excited imaginations, to look at us with its terrible hollow eyes.

After some minutes of silence, the man was vanquished by the Professor. Human instincts succumbed to scien-

tific pride and exultation. Professor Hardwigg, carried away by his enthusiasm, forgot all the circumstances of our journey, the extraordinary position in which we were placed, the immense cavern which stretched far away over our heads. There can be no doubt that he thought himself at the Institution addressing his attentive pupils, for he put on his most doctorial style, waved his hand, and began—

“Gentlemen, I have the honor on this auspicious occasion to present to you a man of the quarternary period of our globe. Many learned men have denied his very existence, while other able persons, perhaps of even higher authority, have affirmed their belief in the reality of his life. If the St. Thomases of palæontology were present, they would reverentially touch him with their fingers and believe in his existence, thus acknowledging their obstinate heresy. I know that science should be careful in relation to all discoveries of this nature. I am not without having heard of the many Barnums and other quacks who have made a trade of such like pretended discoveries. I have, of course, heard of the discovery of the knee-bones of Ajax, of the pretended finding of the body of Orestes by the Spartiates, and of the body of Asterius, ten spans long, fifteen feet—of which we read in Pausanias.

“I have read everything in relation to the skeleton of Trapani, discovered in the fourteenth century, and which many persons chose to regard as that of Polyphemus, and the history of the giant dug up during the sixteenth century in the environs of Palmyra. You are as well aware as I am, gentlemen, of the existence of the celebrated analysis made near Lucerne, in 1577, of the great bones which the celebrated Doctor Felix Plater declared belonged to a giant about nineteen feet high. I have devoured all the treatises of Cassanion, and all those memoirs, pamphlets, speeches, and replies, published in reference to the

skeleton of Teutobochus, king of the Cimbri, the invader of Gaul, dug out of a gravel pit in Dauphiny, in 1613. In the eighteenth century I should have denied, with Peter Campet, the existence of the preadamites of Scheuchzer. I have had in my hands the writing called Gigans—”

Here my uncle was afflicted by the natural infirmity which prevented him from pronouncing difficult words in public. It was not exactly stuttering, but a strange sort of constitutional hesitation.

“The writing named Gigans—” he repeated.

He, however, could get no further.

“*Giganteo*——”

Impossible! The unfortunate word would not come out. There would have been great laughter at the Institution, had the mistake happened there.

“Gigantosteology!” at last exclaimed Professor Hardwigg, between two savage growls.

Having got over our difficulty, and getting more and more excited—

“Yes, gentlemen, I am well acquainted with all these matters, and know, also, that Cuvier and Blumenbach fully recognized in these bones, the undeniable remains of mammoths of the quaternary period. But after what we now see, to allow a doubt is to insult scientific inquiry. There is the body; you can see it; you can touch it. It is not a skeleton, it is a complete and uninjured body, preserved with an anthropological object.”

I did not attempt to controvert this singular and astounding assertion.

“If I could but wash this corpse in a solution of sulphuric acid,” continued my uncle, “I would undertake to remove all the earthy particles, and these resplendent shells, which are incrustated all over this body. But I am without this precious dissolving medium. Nevertheless, such as it is, this body will tell its own history.”

Here the Professor held up the fossil body, and exhibited it with rare dexterity. No professional showman could have shown more activity.

“As on examination you will see,” my uncle continued, “it is only about six feet in length, which is a long way from the pretended giants of early days. As to the particular race to which it belonged, it is incontestably Caucasian. It is of the white race, that is, of our own. The skull of this fossil being is a perfect ovoid without any remarkable or prominent development of the cheek bones, and without any projection of the jaw. It presents no indication of the prognathism which modifies the facial angle.* Measure the angle for yourselves, and you will find that it is just ninety degrees. But I will advance still farther on the road of inquiry and deduction, and I dare venture to say that this human sample or specimen belongs to the Japhetic family, which spread over the world from India to the uttermost limits of western Europe. There is no occasion, gentlemen, to smile at my remarks.”

Of course nobody smiled. But the excellent Professor was so accustomed to beaming countenances at his lectures, that he believed he saw all his audience laughing during the delivery of his learned dissertation.

“Yes,” he continued, with renewed animation, “this is a fossil man, a contemporary of the mastodons, with the bones of which this whole amphitheatre is covered. But if I am called on to explain how he came to this place, how these various strata by which he is covered have fallen into this vast cavity, I can undertake to give you no explanation. Doubtless, if we carry ourselves back to the quaternary epoch, we shall find that great and mighty convulsions

* The facial angle is formed by two planes—one more or less vertical which is in a straight line with the forehead and the incisors; the other, horizontal, which passes through the organs of hearing, and the lower nasal bone. Prognathism, in anthropological language, means that particular projection of the jaw which modifies the facial angle.

took place in the crust of the earth ; the continually cooling operation, through which the earth had to pass, produced fissures, landslips, and chasms, through which a large portion of the earth made its way. I come to no absolute conclusion, but there is the man, surrounded by the works of his hands, his hatchets, and his carved flints, which belong to the stony period ; and the only rational supposition is, that, like myself, he visited the centre of the earth as a travelling tourist, a pioneer of science. At all events, there can be no doubt of his great age, and of his being one of the oldest race of human beings."

The Professor with these words ceased his oration, and I burst forth into loud and "unanimous" applause. Besides, after all, my uncle was right. Much more learned men than his nephew would have found it rather hard to refute his facts and arguments.

Another circumstance soon presented itself. This fossilized body was not the only one in this vast plain of bones—the cemetery of an extinct world. Other bodies were found, as we trod the dusty plain, and my uncle was able to choose the most marvellous of these specimens in order to convince the most incredulous.

In truth, it was a surprising spectacle, the successive remains of generations and generations of men and animals confounded together in one vast cemetery. But a great question now presented itself to our notice, and one we were actually afraid to contemplate in all its bearings.

Had these once animated beings been buried so far beneath the soil by some tremendous convulsion of nature, after they had been earth to earth and ashes to ashes, or had they lived here below, in this subterranean world, under this factitious sky, born, married, and given in marriage, and dying at last, just like ordinary inhabitants of the earth?

Up to the present moment, marine monsters, fish, and such like animals, had alone been seen alive !

The question which rendered us rather uneasy, was a pertinent one. Were any of these men of the abyss wandering about the deserted shores of this wondrous sea of the centre of the earth?

This was a question which rendered me very uneasy and uncomfortable. How, should they really be in existence, would they receive us men from above?

CHAPTER XXXVI.

WHAT IS IT?

FOR a long and weary hour we tramped over this great bed of bones. We advanced regardless of everything, drawn on by ardent curiosity. What other marvels did this great cavern contain—what other wondrous treasures for the scientific man? My eyes were quite prepared for any number of surprises, my imagination lived in expectation of something new and wonderful.

The borders of the great Central Ocean had for some time disappeared behind the hills that were scattered over the ground occupied by the plain of bones. The imprudent and enthusiastic Professor, who did not care whether he lost himself or not, hurried me forward. We advanced silently, bathed in waves of electric fluid.

By reason of a phenomenon which I cannot explain, and thanks to its extreme diffusion, now complete, the light illumined equally the sides of every hill and rock. Its seat appeared to be nowhere, in no determined force, and produced no shade whatever.

The appearance presented was that of a tropical country at mid-day in summer—in the midst of the equatorial regions and under the vertical rays of the sun.

All signs of vapor had disappeared. The rocks, the distant mountains, some confused masses of far-off forests, assumed a weird and mysterious aspect under this equal distribution of the luminous fluid!

We resembled, to a certain extent, the mysterious personage in one of Hoffmann's fantastic tales—the man who lost his shadow. ...

After we had walked about a mile farther, we came to the edge of a vast forest, not, however, one of the vast mushroom forests we had discovered near Port Gretchen.

It was the glorious and wild vegetation of the tertiary period, in all its superb magnificence. Huge palms, of a species now unknown, superb palmacites—a genus of fossil palms from the coal formation—pines, yews, cypress, and conifers or cone-bearing trees, the whole bound together by an inextricable and complicated mass of creeping plants.

A beautiful carpet of mosses and ferns grew beneath the trees. Pleasant brooks murmured beneath umbrageous boughs, little worthy of this name, for no shade did they give. Upon their borders grew small tree-like shrubs, such as are seen in the hot countries on our own inhabited globe.

The one thing wanted to these plants, these shrubs, these trees—was color! For ever deprived of the vivifying warmth of the sun, they were vapid and colorless. All shade was lost in one uniform tint, of a brown and faded character. The leaves were wholly devoid of verdure, and the flowers, so numerous during the tertiary period which gave them birth, were without color and without perfume, something like paper discolored by long exposure to the atmosphere.

My uncle ventured beneath the gigantic groves. I followed him, though not without a certain amount of apprehension. Since nature had shown herself capable of producing such stupendous vegetable productions, why might we not meet with mammals (animals with breasts) as large, and therefore dangerous.

I particularly remarked, in the clearings left by trees that had fallen and been partially consumed by time, many leguminous (bean-like) shrubs, such as the maple and other eatable trees, dear to ruminating animals. Then there appeared confounded together and intermixed, the

trees of such varied lands, specimens of the vegetation of every part of the globe; there was the oak near the palm tree, the Australian eucalyptus, an interesting class of the order *Myrtaceæ*—leaning against the tall Norwegian pine, the poplar of the north, mixing its branches with those of the New Zealand kauris. It was enough to drive the most ingenious classifier of the upper regions out of his mind, and to upset all his received ideas about botany.

Suddenly I stopped short and restrained my uncle.

The extreme diffuseness of the light enabled me to see the smallest objects in the distant copses. I thought I saw—no, I really did see with my own eyes,—immense, gigantic animals moving about under the mighty trees. Yes, they were truly gigantic animals, a whole herd of mastodons, not fossils, but living, and exactly like those discovered in 1801, on the marshy banks of the great Ohio, in North America.

Yes, I could see these enormous elephants, whose trunks were tearing down large boughs, and working in and out the trees like a legion of serpents. I could hear the sounds of the mighty tusks uprooting huge trees!

The boughs crackled, and the whole masses of leaves and green branches went down the capacious throats of these terrible monsters!

That wondrous dream, when I saw the ante-historical times revived, when the tertiary and quaternary periods passed before me, was now realized!

And there we were alone, far down in the bowels of the earth, at the mercy of its ferocious inhabitants!

My uncle paused, full of wonder and astonishment.

“Come,” he said at last, when his first surprise was over, “come along, my boy, and let us see them nearer.”

“No,” replied I, restraining his efforts to drag me forward, “we are wholly without arms. What should we do in the midst of that flock of gigantic quadrupeds?”

Come away, uncle, I implore you. No human creature can with impunity brave the ferocious anger of these monsters."

"No human creature," said my uncle, suddenly lowering his voice to a mysterious whisper, "you are mistaken, my dear Henry. Look! look yonder! It seems to me that I behold a human being—a being like ourselves—a man!"

I looked, shrugging my shoulders, decided to push incredulity to its very last limits. But whatever might have been my wish, I was compelled to yield to the weight of ocular demonstration.

Yes—not more than a quarter of a mile off, leaning against the trunk of an enormous tree, was a human being—a Proteus of these subterranean regions, a new son of Neptune keeping this innumerable herd of mastodons.

*Immanis pecoris custos, immanis ipse!**

Yes—it was no longer a fossil whose corpse we had raised from the ground in the great cemetery, but a giant capable of guiding and driving these prodigious monsters. His height was above twelve feet. His head, as big as the head of a buffalo, was lost in a mane of matted hair. It was indeed a huge mane, like those which belonged to the elephants of the earlier ages of the world.

In his hand was a branch of a tree, which served as a crook for this antediluvian shepherd.

We remained profoundly still, speechless with surprise.

But we might at any moment be seen by him. Nothing remained for us but instant flight.

"Come, come!" I cried, dragging my uncle along; and, for the first time, he made no resistance to my wishes.

A quarter of an hour later we were far away from that terrible monster!

* The keeper of gigantic cattle, himself a giant!



GIGANTIC INHABITANTS.

Now that I think of the matter calmly, and that I reflect upon it dispassionately; now that months, years, have passed since this strange and unnatural adventure befell us,—what am I to think, what am I to believe?

No, it is utterly impossible! Our ears must have deceived us, and our eyes have cheated us! we have not seen what we believed we had seen. No human being could by any possibility have existed in that subterranean world! No generation of men could inhabit the lower caverns of the globe without taking note of those who peopled the surface, without communication with them, It was folly, folly, folly! nothing else!

I am rather inclined to admit the existence of some animal resembling in structure the human race—of some monkey of the first geological epochs, like that discovered by M. Lartet in the ossiferous deposit of Sansan.

But this animal, or being, whichever it was, surpassed in height all things known to modern science. Never mind. However unlikely it may be, it might have been a monkey—but a man, a living man, and with him a whole generation of gigantic animals, buried in the entrails of the earth—it was too monstrous to be believed!

CHAPTER XXXVII.

THE MYSTERIOUS DAGGER.

DURING this time, we had left the bright and transparent forest far behind us. We were mute with astonishment, overcome by a kind of feeling which was next door to apathy. We kept running in spite of ourselves. It was a perfect flight, which resembled one of those horrible sensations we sometimes meet with in our dreams.

Instinctively we made our way towards the Central Sea, and I cannot now tell what wild thoughts passed through my mind, nor of what follies I might have been guilty, but for a very serious pre-occupation which brought me back to practical life.

Though I was aware that we were treading on a soil quite new to us, I, however, every now and then noticed certain aggregations of rock, the shape of which forcibly reminded me of those near Port Gretchen.

This confirmed, moreover, the indications of the compass and our extraordinary and unlooked-for, as well as involuntary, return to the north of this great Central Sea. It was so like our starting point, that I could scarcely doubt the reality of our position. Streams and cascades, fell in hundreds over the numerous projections of the rocks.

I actually thought I could see our faithful and monotonous Hans and the wonderful grotto in which I had come back to life after my tremendous fall.

Then, as we advanced still farther, the position of the cliffs, the appearance of a stream, the unexpected profile of a rock, threw me again into a state of bewildering doubt.

After some time, I explained my state of mental indecision to my uncle. He confessed to a similar feeling of hesitation. He was totally unable to make up his mind in the midst of this extraordinary but uniform panorama.

"There can be no doubt," I insisted, "that we have not landed exactly at the place whence we first took our departure; but the tempest has brought us above our starting point. I think, therefore, that if we follow the coast we shall once more find Port Gretchen."

"In that case," cried my uncle, "it is useless to continue our exploration. The very best thing we can do is to make our way back to the raft. Are you quite sure, Harry, that you are not mistaken?"

"It is difficult," was my reply, "to come to any decision, for all these rocks are exactly alike. There is no marked difference between them. At the same time, the impression on my mind is, that I recognize the promontory at the foot of which our worthy Hans constructed the raft. We are, I am nearly convinced, near the little port: if this be not it," I added, carefully examining a creek which appeared singularly familiar to my mind.

"My dear Harry—if this were the case, we should find traces of our own footsteps, some signs of our passage; and I can really see nothing to indicate our having passed this way."

"But I see something," I cried, in an impetuous tone of voice, as I rushed forward and eagerly picked up something which shone in the sand under my feet.

"What is it?" cried the astonished and bewildered Professor.

"This," was my reply.

And I handed to my startled relative a rusty dagger, of singular shape.

"What made you bring with you so useless a weapon?" he exclaimed. "It was needlessly hampering yourself."

"I bring it?—it is quite new to me. I never saw it before—are you sure it is not out of your collection?"

"Not that I know of," said the Professor, puzzled. "I have no recollection of the circumstance. It was never my property."

"This is very extraordinary," I said, musing over the novel and singular incident.

"Not at all. There is a very simple explanation, Harry. The Icelanders are known to keep up the use of these antiquated weapons, and this must have belonged to Hans, who has let it fall without knowing it."

I shook my head. That dagger had never been in the possession of the pacific and taciturn Hans. I knew him and his habits too well.

"Then what can it be—unless it be the weapon of some antediluvian warrior," I continued, "of some living man, a contemporary of that mighty shepherd from whom we have just escaped? But no—mystery upon mystery—this is no weapon of the stony epoch, nor even of the bronze period. It is made of excellent steel——"

Ere I could finish my sentence, my uncle stopped me short from entering upon a whole train of theories, and spoke in his most cold and decided tone of voice.

"Calm yourself, my dear boy, and endeavor to use your reason. This weapon, upon which we have fallen so unexpectedly, is a true *dague*, one of those worn by gentlemen in their belts during the sixteenth century. Its use was to give the *coup de grâce*, the final blow, to the foe who would not surrender. It is clearly of Spanish workmanship. It belongs neither to you, nor to me, nor the eider-down hunter, nor to any of the living beings who may still exist so marvellously in the interior of the earth."

"What can you mean, uncle?" I said, now lost in a host of surmises.

"Look closely at it," he continued; "these jagged edges

were never made by the resistance of human blood and bone. The blade is covered with a regular coating of iron-mould and rust, which is not a day old, not a year old, not a century old, but much more——”

The Professor began to get quite excited, according to custom, and was allowing himself to be carried away by his fertile imagination. I could have said something. He stopped me.

“Harry,” he cried, “we are now on the verge of a great discovery. This blade of a dagger you have so marvelously discovered, after being abandoned upon the sand for more than a hundred, two hundred, even three hundred years, has been indented by some one endeavoring to carve an inscription on these rocks.”

“But this poignard never got here of itself,” I exclaimed, “it could not have twisted itself. Some one, therefore, must have preceded us upon the shores of this extraordinary sea.”

“Yes, a man.”

“But what man has been sufficiently desperate to do such a thing.”

“A man who has somewhere written his name with this very dagger—a man who has endeavored once more to indicate the right road to the interior of the earth. Let us look around, my boy. You know not the importance of your singular and happy discovery.”

Prodigiously interested, we walked along the wall of rock, examining the smallest fissures, which might finally expand into the much wished for gully or shaft.

We at last reached a spot where the shore became extremely narrow. The sea almost bathed the foot of the rocks, which were here very lofty and steep. There was scarcely a path wider than two yards at any point. At last, under a huge overhanging rock, we discovered the entrance of a dark and gloomy tunnel.

There, on a square tablet of granite, which had been smoothed by rubbing it with another stone, we could see two mysterious, and much worn letters, the two initials of the bold and extraordinary traveller who had preceded us on our adventurous journey.

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“A. S.,” cried my uncle; “you see I was right. Arne Saknussemm, always Arne Saknussemm!”

CHAPTER XXXVIII.

NO OUTLET—BLASTING THE ROCK.

EVER since the commencement of our marvellous journey, I had experienced many surprises, had suffered from many illusions. I thought that I was case-hardened against all surprises and could neither see nor hear anything to amaze me again.

I was like a man who, having been round the world, finds himself wholly *blasé* and proof against the marvellous.

When, however, I saw these two letters, which had been engraven three hundred years before, I stood fixed in an attitude of mute surprise.

Not only was there the signature of the learned and enterprising alchemist written in the rock, but I held in my hand the very identical instrument with which he had laboriously engraved it.

It was impossible, without showing an amount of incredulity scarcely becoming a sane man, to deny the existence of the traveller, and the reality of that voyage which I believed all along to have been a myth—the mystification of some fertile brain.

While these reflections were passing through my mind, my uncle, the Professor, gave way to an access of feverish and poetical excitement.

“Wonderful and glorious Genius, great Saknussem,” he cried, “you have left no stone unturned, no resource omitted, to show to other mortals the way into the interior of our mighty globe, and your fellow-creatures can find the trail left by your illustrious footsteps, three hundred

years ago, at the bottom of these obscure subterranean abodes. You have been careful to secure for others the contemplation of these wonders and marvels of creation. Your name engraved at every important stage of your glorious journey, leads the hopeful traveller direct to the great and mighty discovery to which you devoted such energy and courage. The audacious traveller, who shall follow your footsteps to the last, will doubtless find your initials engraved with your own hand upon the centre of the earth. *I* will be that audacious traveller—*I*, too, will sign my name upon the very same spot, upon the central granite stone of this wondrous work of the Creator. But in justice to your devotion, to your courage, and to your being the first to indicate the road, let this Cape, seen by you upon the shores of this sea discovered by you, be called of all time, Cape Saknussem.

This is what I heard, and I began to be roused to the pitch of enthusiasm indicated by those words. A fierce excitement roused me. I forgot everything. The dangers of the voyage, and the perils of the return journey, were now as nothing!

What another man had done in ages past, could I felt be done again; I was determined to do it myself, and now nothing that man had accomplished appeared to me impossible.

“Forward—forward,” I cried in a burst of genuine and hearty enthusiasm.

I had already started in the direction of the sombre and gloomy gallery, when the Professor stopped me; he, the man so rash and hasty, he, the man so easily roused to the highest pitch of enthusiasm, checked me, and asked me to be patient and show more calm.

“Let us return to our good friend, Hans,” he said; “we will then bring the raft down to this place.”

I must say that though I at once yielded to my uncle’s

request, it was not without dissatisfaction, and I hastened along the rocks of that wonderful coast.

"Do you know, my dear uncle," I said, as we walked along, "that we have been singularly helped by a concurrence of circumstances, right up to this very moment."

"So you begin to see it, do you, Harry?" said the Professor, with a smile.

"Doubtless," I responded, "and strangely enough, even the tempest has been the means of putting us on the right road. Blessings on the tempest! It brought us safely back to the very spot from which fine weather would have driven us forever. Supposing we had succeeded in reaching the southern and distant shores of this extraordinary sea, what would have become of us? The name of Saknussem would never have appeared to us, and at this moment we should have been cast away upon an inhospitable coast, probably without an outlet."

"Yes, Harry, my boy, there is certainly something providential in that wandering at the mercy of wind and waves towards the south: we have come back exactly north; and what is better still, we fall upon this great discovery of Cape Saknussem. I mean to say, that it is more than surprising; there is something in it which is far beyond my comprehension. The coincidence is unheard-of, marvellous!"

"What matter! It is not our duty to explain facts, but to make the best possible use of them."

"Doubtless, my boy; but if you will allow me——" said the really-delighted Professor.

"Excuse me, sir, but I see exactly how it will be; we shall take the northern route; we shall pass under the northern regions of Europe, under Sweden, under Russia, under Siberia, and who knows where—instead of burying ourselves under the burning plains and deserts of Africa, or beneath the mighty waves of the ocean; and that is all,

at this stage of our journey, that I care to know. Let us advance, and Heaven will be our guide!"

"Yes, Harry, you are right, quite right; all is for the best. Let us abandon this horizontal sea, which could never have led to anything satisfactory. We shall descend, descend, and everlastingly descend. Do you know, my dear boy, that to reach the interior of the earth we have only five thousand miles to travel!"

"Bah!" I cried, carried away by a burst of enthusiasm, "the distance is scarcely worth speaking about. The thing is to make a start."

My wild, mad, and incoherent speeches continued until we rejoined our patient and phlegmatic guide. All was, we found, prepared for an immediate departure. There was not a single parcel but what was in its proper place. We all took up our posts on the raft, and the sail being hoisted, Hans received his directions, and guided the frail barque towards Cape Saknussem, as we had definitely named it.

The wind was very unfavorable to a craft that was unable to sail close to the wind. It was constructed to go before the blast. We were continually reduced to pushing ourselves forward by means of poles. On several occasions the rocks ran far out into deep water and we were compelled to make a long round. At last, after three long and weary hours of navigation, that is to say, about six o'clock in the evening, we found a place at which we could land.

I jumped on shore first. In my present state of excitement and enthusiasm, I was always first. My uncle and the Icelandic followed. The voyage from the port to this point of the sea had by no means calmed me. It had rather produced the opposite effect. I even proposed to burn our vessel, that is to destroy our raft, in order to completely cut off our retreat. But my uncle sternly opposed this wild project. I began to think him particularly lukewarm and unenthusiastic.

"At any rate, my dear uncle," I said, "let us start without delay."

"Yes, my boy, I am quite as eager to do so as you can be. But, in the first place, let us examine this mysterious gallery, in order to find if we shall need to prepare and mend our ladders."

My uncle now began to see to the efficiency of our Ruhmkorf's coil, which would doubtless soon be needed; the raft, securely fastened to a rock, was left alone. Moreover, the opening into the new gallery was not twenty paces distant from the spot. Our little troop, with myself at the head, advanced.

The orifice, which was almost circular, presented a diameter of about five feet; the sombre tunnel was cut in the living rock, and coated on the inside by the different material which had once passed through it in a state of fusion. The lower part was about level with the water, so that we were able to penetrate to the interior without difficulty.

We followed an almost horizontal direction; when, at the end of about a dozen paces, our further advance was checked by the interposition of an enormous block of granite rock.

"Accursed stone!" I cried, furiously, on perceiving that we were stopped by what seemed an insurmountable obstacle.

In vain we looked to the right, in vain we looked to the left; in vain examined it above and below. There existed no passage, no sign of any other tunnel. I experienced the most bitter and painful disappointment. So enraged was I that I would not admit the reality of any obstacle. I stooped to my knees; I looked under the mass of stone. No hole, no interstice. I then looked above. The same barrier of granite! Hans, with the lamp, examined the sides of the tunnel in every direction.

• But all in vain! It was necessary to renounce all hope of passing through.

I had seated myself upon the ground. My uncle walked angrily and hopelessly up and down. He was evidently desperate.

“But,” I cried, after some moments’ thought, “what about Arne Saknussem?”

“You are right,” replied my uncle, “he can never have been checked by a lump of rock.”

“No—ten thousand times no,” I cried, with extreme vivacity. “This huge lump of rock, in consequence of some singular concussion, or process, one of those magnetic phenomena which have so often shaken the terrestrial crust, has in some unexpected way closed up the passage. Many and many years have passed away since the return of Saknussem, and the fall of this huge block of granite. Is it not quite evident that this gallery was formerly the outlet for the pent-up lava in the interior of the earth, and that these eruptive matters then circulated freely? Look at these recent fissures in the granite roof; it is evidently formed of pieces of enormous stone, placed here as if by the hand of a giant, who had worked to make a strong and substantial arch. One day, after an unusually strong shock, the vast rock which stands in our way, and which was doubtless the key of a kind of arch, fell through to a level with the soil and has barred our further progress. We are right, then, in thinking that this is an unexpected obstacle, with which Saknussem did not meet; and if we do not upset it in some way, we are unworthy of following in the footsteps of the great discoverer; and incapable of finding our way to the Centre of the Earth!”

In this wild way I addressed my uncle. The zeal of the Professor, his earnest longing for success, had become part and parcel of my being. I wholly forgot the past; I utterly despised the future. Nothing existed for me up-



THE FEARFUL EXPLOSION.

on the surface of this spheroid in the bosom of which I was engulfed, no towns, no country, no Hamburg, no Königsstrasse, not even my poor Gretchen, who by this time would believe me utterly lost in the interior of the earth!

"Well," cried my uncle, roused to enthusiasm by my words, "let us go to work with pick-axes, with crowbars, with anything that comes to hand—but down with these terrible walls."

"It is far too tough and too big to be destroyed by a pick-axe or crowbar," I replied.

"What then?"

"As I said, it is useless to think of overcoming such a difficulty by means of ordinary tools."

"What then?"

"What else but gunpowder, a subterranean mine? Let us blow up the obstacle that stands in our way."

"Gunpowder!"

"Yes; all we have to do is to get rid of this paltry obstacle."

"To work, Hans, to work!" cried the Professor.

The Iclander went back to the raft, and soon returned with a huge crowbar, with which he began to dig a hole in the rock, which was to serve as a mine. It was by no means a slight task. It was necessary for our purpose to make a cavity large enough to hold fifty pounds of fulminating gun cotton, the expansive power of which is four times as great as that of ordinary gunpowder.

I had now roused myself to an almost miraculous state of excitement. While Hans was at work, I actively assisted my uncle to prepare a long wick, made from damp gunpowder, the mass of which we finally enclosed in a bag of linen.

"We are bound to go through," I cried, enthusiastically.

"We are bound to go through," responded the Professor, tapping me on the back.

At midnight, our work as miners was completely finished; the charge of fulminating cotton was thrust into the hollow, and the match, which we had made of considerable length, was ready.

A spark was now sufficient to ignite this formidable engine, and to blow the rock to atoms!

“We will now rest until to-morrow.”

It was absolutely necessary to resign myself to my fate, and to consent to wait for the explosion for six weary hours!

CHAPTER XXXIX.

THE EXPLOSION AND ITS RESULTS.

THE next day, which was the twenty-seventh of August, was a date celebrated in our wondrous, subterranean journey.

I never think of it even now, but I shudder with horror. My heart beats wildly at the very memory of that awful day.

From this time forward, our reason, our judgment, our human ingenuity, have nothing to do with the course of events. We are about to become the plaything of the great phenomena of the earth!

At six o'clock we were all up and ready. The dreaded moment was arriving when we were about to seek an opening into the interior of the earth by means of gunpowder. What would be the consequences of breaking through the crust of the earth?

I begged that it might be my duty to set fire to the mine. I looked upon it as an honor. • This task once performed, I could rejoin my friends upon the raft, which had not been unloaded. As soon as we were all ready, we were to sail away to some distance to avoid the consequences of the explosion, the effects of which would certainly not be concentrated in the interior of the earth.

The slow match we calculated to burn for about ten minutes, more or less, before it reached the chamber in which the great body of powder was confined. I should therefore have plenty of time to reach the raft and put off to a safe distance.

I prepared to execute my self-allotted task—not, it must be confessed, without considerable emotion.

After a hearty repast, my uncle and the hunter-guide embarked on board the raft, while I remained alone upon the desolate shore.

I was provided with a lantern which was to enable me to set fire to the wick of the infernal machine.

"Go, my boy," said my uncle, "and Heaven be with you. But come back as soon as you can. I shall be all impatience."

"Be easy on that matter," I replied, "there is no fear of my delaying on the road."

Having said this, I advanced toward the opening of the sombre gallery. My heart beat wildly. I opened my lantern and seized the extremity of the wick.

The Professor, who was looking on, held his chronometer in his hand.

"Are you ready?" cried he.

"Quite ready."

"Well, then, fire away!"

I hastened to put the light to the wick, which crackled and sparkled, hissing and spitting like a serpent; then, running as fast as I could, I returned to the shore.

"Get on board my lad, and you, Hans, shove off," cried my uncle.

By a vigorous application of his pole Hans sent us flying over the water. The raft was quite twenty fathoms distant.

It was a moment of palpitating interest, of deep anxiety. My uncle, the Professor, never took his eyes off the chronometer.

"Only five minutes more," he said in a low tone, "only four, only three."

My pulse went a hundred to the minute. I could hear my heart beating.

"Only two, one! Now, then, mountains of granite, crumble beneath the power of man!"

What happened after that? As to the terrific roar of the explosion, I do not think I heard it. But the form of the rocks completely changed in my eyes—they seemed to be drawn aside like a curtain. I saw a fathomless, a bottomless abyss, which yawned beneath the turgid waves. The sea, which seemed suddenly to have gone mad, then became one great mountainous mass, upon the top of which the raft rose perpendicularly.

We were all thrown down. In less than a second the light gave place to the most profound obscurity. Then I felt all solid support give way not to my feet, but to the raft itself. I thought it was going bodily down a tremendous well. I tried to speak, to question my uncle. Nothing could be heard but the roaring of the mighty waves. We clung together in utter silence.

Despite the awful darkness, despite the noise, the surprise, the emotion, I thoroughly understood what had happened.

Beyond the rock which had been blown up, there existed a mighty abyss. The explosion had caused a kind of earthquake in this soil, broken by fissures and rents. The gulf, thus suddenly thrown open, was about to swallow the inland sea, which, transformed into a mighty torrent, was dragging us with it.

One only idea filled my mind. We were utterly and completely lost!

One hour, two hours—what more I cannot say, passed in this manner. We sat close together, elbow touching elbow, knee touching knee! We held one another's hands not to be thrown off the raft. We were subjected to the most violent shocks, whenever our sole dependence, a frail wooden raft, struck against the rocky sides of the channel. Fortunately for us, these concussions became less and less frequent, which made me fancy that the gallery was getting wider and wider. There could be now no doubt that we

had chanced upon the road once followed by Saknussem, but instead of going down in a proper manner, we had, through our own imprudence, drawn a whole sea with us!

These ideas presented themselves to my mind in a very vague and obscure manner. I felt rather than reasoned. I put my ideas together only confusedly, while spinning along like a man going down a waterfall. To judge by the air which, as it were, whipped my face, we must have been rushing at a perfectly lightning rate.

To attempt under these circumstances to light a torch was simply impossible, and the last remains of our electric machine, of our Ruhmkorf's coil, had been destroyed during the fearful explosion.

I was therefore very much confused to see at last a bright light shining close to me. The calm countenance of the guide seemed to gleam upon me. The clever and patient hunter had succeeded in lighting the lantern; and though, in the keen and thorough draught, the flame flickered and vacillated and was nearly put out, it served partially to dissipate the awful obscurity.

The gallery into which we had entered was very wide. I was, therefore, quite right in that part of my conjecture. The insufficient light did not allow us to see both of the walls at the same time. The slope of waters, which was carrying us away, was far greater than that of the most rapid river of America. The whole surface of the stream seemed to be composed of liquid arrows, darted forward with extreme violence and power. I can give no idea of the impression it made upon me.

The raft, at times, caught in certain whirlpools, and rushed forward, yet turned on itself all the time. How it did not upset I shall never be able to understand. When it approached the sides of the gallery, I took care to throw upon them the light of the lantern, and I was able to judge of the rapidity of motion by looking at the project-

ing masses of rock, which as soon as seen were again invisible. So rapid was our progress, that points of rock, at a considerable distance one from the other, appeared like portions of transverse lines, which enclosed us in a kind of net, like that of a line of telegraphic wires.

I believe we were now going at a rate of not less than a hundred miles an hour.

My uncle and I looked at one another with wild and haggard eyes; we clung convulsively to the stump of the mast, which, at the moment when the catastrophe took place, had snapped short off. We turned our backs as much as possible to the wind, in order not to be stifled by a rapidity of motion which nothing human could face and live.

And still the long monotonous hours went on. The situation did not change in the least, though a discovery I suddenly made seemed to complicate it very much.

When we had slightly recovered our equilibrium, I proceeded to examine our cargo. I then made the unsatisfactory discovery that the greater part of it had utterly disappeared.

I became alarmed, and determined to discover what were our resources. My heart beat at the idea, but it was absolutely necessary to know on what we had to depend. With this view, I took the lantern and looked around.

Of all our former collection of nautical and philosophical instruments there remained only the chronometer and the compass. The ladders and ropes were reduced to a small piece of rope fastened to the stump of the mast. Not a pickaxe, not a crowbar, not a hammer, and, far worse than all, no food—not enough for one day!

This discovery was a prelude to a certain and horrible death.

Seated gloomily on the raft, clasping the stump of the mast mechanically, I thought of all I had read as to sufferings from starvation.

I remembered everything that history had taught me on the subject, and I shuddered at the remembrance of the agonies to be endured.

Maddened at the prospects of enduring the miseries of starvation, I persuaded myself that I must be mistaken. I examined the cracks in the raft; I poked between the joints and beams; I examined every possible hole and corner. The result was—simply nothing!

Our stock of provisions consisted of nothing but a piece of dry meat and some soaked and half-mouldy biscuits.

I gazed around me scared and frightened. I could not understand the awful truth. And yet of what consequence was it in regard to any new danger? Supposing that we had had provisions for months, and even for years, how could we ever get out of the awful abyss into which we were being hurled by the irresistible torrent we had let loose?

Why should we trouble ourselves about the sufferings and tortures to be endured from hunger, when death stared us in the face under so many other swifter and perhaps even more horrid forms?

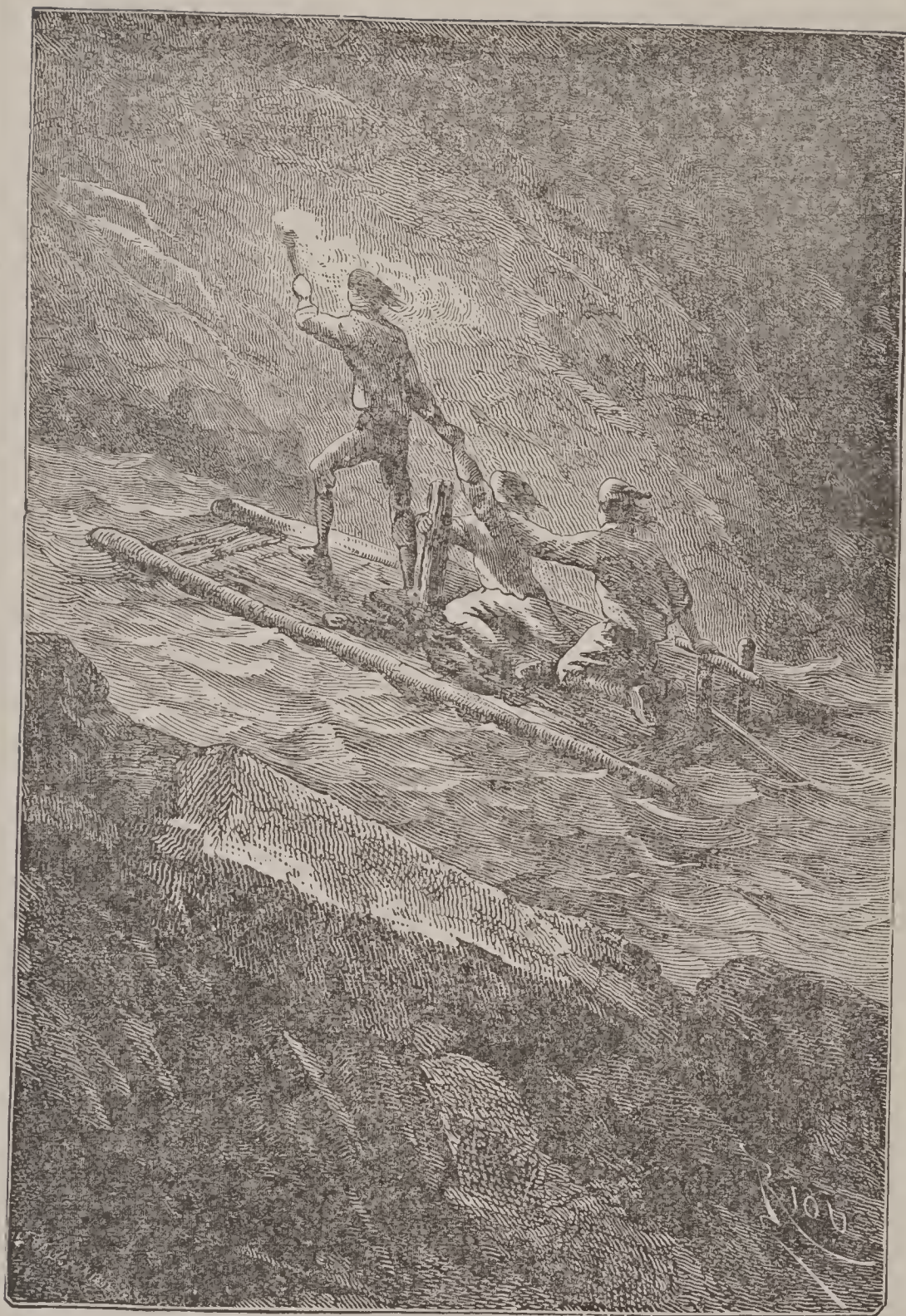
It was very doubtful, under the circumstances in which we were placed, if we should have time to die of inanition.

But the human frame is singularly constituted.

I knew not how it was; but, from some singular hallucination of the mind, I forgot the real, serious and immediate danger to which we were exposed, to think of the menaces of the future, which appeared before us in all their naked terror. Besides, after all, suggested Hope, perhaps we might finally escape the fury of the raging torrent, and once more revisit the glimpses of the moon, on the surface of our beautiful mother earth.

How was it to be done? I had not the remotest idea. Where were we to come out? No matter, so that we did.

One chance in a thousand is always a chance, while death from hunger gave us not even the faintest glimpse



THE TORCH-LIGHT PASSAGE.

of hope. It left to the imagination nothing but blank horror, without the faintest chance of escape!

I had the greatest mind to reveal all to my uncle, to explain to him the extraordinary and wretched position to which we were reduced, in order that, between the two, we might make a calculation as to the exact space of time which remained for us to live.

It was, it appeared to me, the only thing to be done. But I had the courage to hold my tongue, to gnaw at my entrails like the Spartan boy. I wished to leave him all his coolness.

At this moment, the light of the lantern slowly fell, and at last went out!

The wick had wholly burnt to an end. The obscurity became absolute. It was no longer possible to see through the impenetrable darkness! There was one torch left, but it was impossible to keep it alight. Then, like a child, I shut my eyes, that I might not see the darkness.

After a great lapse of time, the rapidity of our journey increased. I could feel it by the rush of air upon my face. The slope of the waters was excessive. I began to feel that we were no longer going down a slope; we were falling. I felt as one does in a dream, going down bodily—falling; falling; falling!

I felt that the hands of my uncle and Hans were vigorously clasping my arms.

Suddenly, after a lapse of time scarcely appreciable, I felt something like a shock. The raft had not struck a hard body, but had suddenly been checked in its course. A waterspout, a liquid column of water, fell upon us. I felt suffocating. I was being drowned.

Still the sudden inundation did not last. In a few seconds I felt myself once more able to breathe. My uncle and Hans pressed my arms, and the raft carried us all three away.

CHAPTER XL.

THE APE GIGANS.

It is difficult for me to determine what was the real time, but I should suppose, by after calculation, that it must have been ten at night.

I lay in a stupor, a half dream, during which I saw visions of astounding character. Monsters of the deep were side by side with the mighty elephantine shepherd. Gigantic fish and animals seemed to form strange conjunctions.

The raft took a sudden turn, whirled round; entered another tunnel; this time illumined in a most singular manner. The roof was formed of porous stalactite, through which a moon-lit vapor appeared to pass, casting its brilliant light upon our gaunt and haggard figures. The light increased as we advanced, while the roof ascended; until at last, we were once more in a kind of water cavern, the lofty dome of which disappeared in a luminous cloud!

A rugged cavern of small extent appeared to offer a halting place to our weary bodies.

My uncle and the guide moved as men in a dream. I was afraid to waken them, knowing the danger of such a sudden start. I seated myself beside them to watch.

As I did so, I became aware of something moving in the distance, which at once fascinated my eyes. It was floating, apparently, upon the surface of the water, advancing by means of what at first appeared paddles. I looked with glaring eyes. One glance told me that it was something monstrous.

But what?

It was the great *Shark Crocodile* of the early writers on geology. About the size of an ordinary whale, with hideous jaws and two gigantic eyes, it advanced. Its eyes fixed on me with terrible sternness. Some indefinite warning told me that it had marked me for its own.

I attempted to rise—to escape, no matter where, but my knees shook under me; my limbs trembled violently; I almost lost my senses. And still the mighty monster advanced. My uncle and the guide made no effort to save themselves.

With a strange noise, like none other I had ever heard, the beast came on. His jaws were at least seven feet apart, and his distended mouth looked large enough to have swallowed a boatful of men.

We were about ten feet distant, when I discovered that much as his body resembled that of a crocodile, his mouth was wholly that of a shark.

His twofold nature now became apparent. To snatch us up at a mouthful it was necessary for him to turn on his back, which motion necessarily caused his legs to kick up helplessly in the air.

I actually laughed even in the very jaws of death!

But next minute, with a wild cry, I darted away into the interior of the cavern, leaving my unhappy comrades to their fate! This cavern was deep and dreary. After about a hundred yards, I paused and looked around.

The whole floor, composed of sand and malachite, was strewn with bones, freshly-gnawed bones of reptiles and fish, with a mixture of mammalia. My very soul grew sick as my body shuddered with horror. I had truly, according to the old proverb, fallen out of the frying-pan into the fire. Some beast larger and more ferocious even than the Shark-Crocodile inhabited this den.

What could I do? The mouth of the cave was guarded by one ferocious monster, the interior was inhabited by

something too hideous to contemplate. Flight was impossible!

One only resource remained, and that was to find some small hiding-place to which the fearful denizens of the cavern could not penetrate. I gazed wildly around, and at last discovered a fissure in the rock, to which I rushed in the hope of recovering my scattered senses.

Crouching down, I waited shivering as in an ague fit. No man is brave in presence of an earthquake, or a bursting boiler, or an exploding torpedo. I could not be expected to feel much courage in presence of the fearful fate that appeared to await me.

An hour passed. I heard all the time a strange rumbling outside the cave.

What was the fate of my unhappy companions? It was impossible for me to pause to inquire. My own wretched existence was all I could think of.

Suddenly a groaning, as of fifty bears in a fight, fell upon my ears—hisses, spitting, moaning, hideous to hear—and then I saw—

Never, were ages to pass over my head, shall I forget the horrible apparition.

It was the Ape Gigans!

Fourteen feet high, covered with coarse hair, of a blackish brown, the hair on the arms, from the shoulder to the elbow joints, pointing downwards, while that from the wrist to the elbow pointed upwards, it advanced. Its arms were as long as its body, while its legs were prodigious. It had thick, long, and sharply-pointed teeth—like a mammoth saw.

It struck its breast as it came on smelling and sniffing, reminding me of the stories we read in our early childhood of giants who ate the flesh of men and little boys!

Suddenly it stopped. My heart beat wildly, for I was conscious that, somehow or other, the fearful monster had

smelt me out and was peering about with his hideous eyes to try and discover my whereabouts.

My reading, which as a rule is a blessing, but which on this occasion, seemed momentarily to prove a curse, told me the real truth. It was the Ape Gigans, the Antediluvian Gorilla.

Yes! This awful monster, confined by good fortune to the interior of the earth, was the progenitor of the hideous monster of Africa.

He glared wildly about, seeking something—doubtless myself. I gave myself up for lost. No hope of safety or escape seemed to remain.

At this moment, just as my eyes appeared to close in death, there came a strange noise from the entrance of the cave; and turning, the Gorilla evidently recognized some enemy more worthy his prodigious size and strength. It was the huge Shark-Crocodile, which perhaps having disposed of my friends, was coming in search of further prey.

The Gorilla placed himself on the defensive, and clutching a bone some seven or eight feet in length, a perfect club, aimed a deadly blow at the hideous beast, which reared upwards and fell with all its weight upon its adversary.

A terrible combat, the details of which it is impossible to give, now ensued. The struggle was awful and ferocious. I however, did not wait to witness the result. Regarding myself as the object of contention, I determined to remove from the presence of the victor. I slid down from my hiding-place, reached the ground, and gliding against the wall, strove to gain the open mouth of the cavern.

But I had not taken many steps when the fearful clamor ceased, to be followed by a mumbling and groaning which appeared to be indicative of victory.

I looked back and saw the huge ape, gory with blood, coming after me with glaring eyes, with dilated nostrils that gave forth two columns of heated vapor. I could feel his hot and fetid breath on my neck; and with a horrid jump—awoke from my nightmare sleep.

Yes—it was all a dream. I was still on the raft with my uncle and the guide.

The relief was not instantaneous, for under the influence of the hideous nightmare my senses had become numbed. After a while, however, my feelings were tranquillized. The first of my perceptions which returned in full force was that of hearing. I listened with acute and attentive ears. All was still as death. All I comprehended was silence. To the roaring of the waters, which had filled the gallery with awful reverberations, succeeded perfect peace.

After some little time my uncle spoke, in a low and scarcely audible tone—

“Harry, boy, where are you?”

“I am here,” was my faint rejoinder.

“Well, don’t you see what has happened? We are going upwards.”

“My dear uncle, what can you mean?” was my half delirious reply.

“Yes, I tell you we are ascending rapidly. Our downward journey is quite checked.”

I held out my hand, and, after some little difficulty, succeeded in touching the wall. My hand was in an instant covered with blood. The skin was torn from the flesh. We were ascending with extraordinary rapidity.

“The torch—the torch!” cried the Professor, wildly; “it must be lighted.”

Hans, the guide, after many vain efforts, at last succeeded in lighting it, and the flame having now nothing to prevent its burning, shed a tolerably clear light. We were enabled to form an approximate idea of the truth.

"It is just as I thought," said my uncle, after a moment or two of silent attention. "We are in a narrow well about four fathoms square. The waters of the great inland sea, having reached the bottom of the gulf, are now forcing themselves up the mighty shaft. As a natural consequence, we are being cast up on the summit of the waters."

"That I can see," was my lugubrious reply; "but where will this shaft end, and to what fall are we likely to be exposed?"

"Of that I am as ignorant as yourself. All I know is, that we should be prepared for the worst. We are going up at a fearfully rapid rate. As far as I can judge, we are ascending at the rate of two fathoms a second, of a hundred and twenty fathoms a minute, or rather more than three and a-half leagues an hour. At this rate, our fate will soon be a matter of certainty."

"No doubt of it," was my reply. "The great concern I have now, however, is to know whether this shaft has any issue. It may end in a granite roof—in which case we shall be suffocated by compressed air, or dashed to atoms against the top. I fancy, already, that the air is beginning to be close and condensed. I have a difficulty in breathing."

This might be fancy, or it might be the effect of our rapid motion, but I certainly felt a great oppression of the chest.

"Henry," said the Professor, "I do believe that the situation is to a certain extent desperate. There remain, however, many chances of ultimate safety, and I have, in my own mind, been revolving them over, during your heavy but agitated sleep. I have come to this logical conclusion—whereas we may at any moment perish, so at any moment we may be saved! We need, therefore, prepare ourselves for whatever may turn up in the great chapter of accidents."

"But what would you have us do?" I cried; "are we not utterly helpless?"

"No! While there is life there is hope. At all events, there is one thing we can do—eat, and thus obtain strength to face victory or death."

As he spoke, I looked at my uncle with a haggard glance. I had put off the fatal communication as long as possible. It was now forced upon me, and I must tell him the truth. Still I hesitated.

"Eat," I said, in a deprecating tone as if there were no hurry.

"Yes, and at once. I feel like a starving prisoner," he said, rubbing his yellow and shivering hands together.

And, turning round to the guide, he spoke some hearty, cheering words, as I judged from his tone, in Danish. Hans shook his head in a terribly significant manner. I tried to look unconcerned.

"What!" cried the Professor, "you do not mean to say that all our provisions are lost?"

"Yes," was my lowly-spoken reply, as I held out something in my hand, "this morsel of dried meat is all that remains for us three."

My uncle gazed at me as if he could not fully appreciate the meaning of my words. The blow seemed to stun him by its severity. I allowed him to reflect for some moments.

"Well," said I, after a short pause, "what do you think now? Is there any chance of our escaping from our horrible subterranean dangers? Are we not doomed to perish in the great hollows of the Centre of the Earth?"

But my pertinent questions brought no answer. My uncle either heard me not, or appeared not to do so.

And in this way a whole hour passed. Neither of us cared to speak. For myself, I began to feel the most fearful and devouring hunger. My companions, doubtless,

felt the same horrible tortures, but neither of them would touch the wretched morsel of meat that remained. It lay there, a last remnant of all our great preparations for the mad and senseless journey!

I looked back, with wonderment, to my own folly. Fully was I aware that, despite his enthusiasm, and the ever-to-be-hated scroll of Saknussem, my uncle should never have started on his perilous voyage. What memories of the happy past, what previsions of the horrible future, now filled my brain!

CHAPTER XLI.

HUNGER.

HUNGER, prolonged, is temporary madness!

The brain is at work without its required food, and the most fantastic notions fill the mind. Hitherto I had never known what hunger really meant. I was likely to understand it now.

And yet, three months before I could tell my terrible story of starvation, as I thought it. As a boy I used to make frequent excursions in the neighborhood of the Professor's house.

My uncle always acted on system, and he believed that, in addition to the day of rest and worship, there should be a day of recreation. In consequence, I was always free to do as I liked on a Wednesday.

Now, as I had a notion to combine the useful and the agreeable, my favorite pastime was birds' nesting. I had one of the best collections of eggs in all the town. They were classified, and under glass cases.

There was a certain wood, which, by rising at early morn, and taking the cheap train, I could reach at eleven in the morning. Here I would botanize or geologize at my will. My uncle was always glad of specimens for his herbarium, and stones to examine. When I had filled my wallet, I proceeded to search for nests

After about two hours of hard work, I, one day, sat down by a stream to eat my humble but copious lunch. How the remembrance of the spiced sausage, the wheaten loaf, and the beer, made my mouth water now! I would have given every prospect of worldly wealth for such a meal. But to my story.

While seated thus at my leisure, I looked up at the ruins of an old castle, at no great distance. It was the remains of an historical dwelling, ivy-clad, and now falling to pieces.

While looking, I saw two eagles circling about the summit of a lofty tower. I soon became satisfied that there was a nest. Now, in all my collection, I wanted eggs of the native eagle and the large owl.

My mind was made up. I would reach the summit of that tower, or perish in the attempt. I went nearer, and surveyed the ruins. The old staircase, years before, had fallen in. The outer walls were, however, intact. There was no chance that way, unless I looked to the ivy solely for support. This was, as I soon found out, futile.

There remained the chimney, which still went up to the top, and had once served to carry off the smoke from every story of the tower.

Up this I determined to venture. It was narrow, rough, and therefore the more easily climbed. I took off my coat and crept into the chimney. Looking up, I saw a small, light opening, proclaiming the summit of the chimney.

Up—up I went, for some time using my hands and knees, after the fashion of a chimney sweep. It was slow work, but, there being continual projections, the task was comparatively easy. In this way, I reached half way. The chimney now became narrower. The atmosphere was close, and, at last, to end the matter, I stuck fast. I could ascend no higher.

There could be no doubt of this, and there remained no resource but to descend, and give up my glorious prey in despair. I yielded to fate and endeavored to descend. But I could not move. Some unseen and mysterious obstacle intervened and stopped me. In an instant the full horror of my situation seized me.

I was unable to move either way, and was doomed to a terrible and horrible death, that of starvation. In a boy's mind, however, there is an extraordinary amount of elasticity and hope, and I began to think of all sorts of plans to escape my gloomy fate.

In the first place, I required no food just at present, having had an excellent meal, and was therefore allowed time for reflection. My first thought was to try and move the mortar with my hand. Had I possessed a knife, something might have been done, but that useful instrument I had left in my coat pocket.

I soon found that all efforts of this kind were vain and useless, and that all I could hope to do was to wriggle downwards.

But though I jerked and struggled, and strove to turn, it was all in vain. I could not move an inch, one way or the other. And time flew rapidly. My early rising probably contributed to the fact that I felt sleepy, and gradually gave way to the sensation of drowsiness.

I slept, and awoke in darkness, ravenously hungry.

Night had come, and still I could not move. I was tight bound, and did not succeed in changing my position an inch. I groaned aloud. Never since the days of my happy childhood, when it was a hardship to go from meal to meal without eating, had I really experienced hunger. The sensation was as novel as it was painful. I began now to lose my head and to scream and cry out in my agony. Something appeared, startled by my noise. It was a harmless lizard, but it appeared to me a loathsome reptile. Again I made the old ruins resound with my cries, and finally so exhausted myself that I fainted.

How long I lay in a kind of trance or sleep I cannot say, but when again I recovered consciousness it was day. How ill I felt, how hunger still gnawed at me, it would be hard to say. I was too weak to scream now, far too weak to struggle.

Suddenly I was startled by a roar.

“Are you there, Henry?” said the voice of my uncle; “are you there, my boy?”

I could only faintly respond, but I also made a desperate effort to turn. Some mortar fell. To this I owed my being discovered. When the search took place, it was easily seen that mortar and small pieces of stone had recently fallen from above. Hence my uncle’s cry.

“Be calm,” he cried, “if we pull down the whole ruin, you shall be saved.”

They were delicious words, but I had little hope.

Soon however, about a quarter of an hour later, I heard a voice *above me*, at one of the upper fire-places.

“Are you below or above?”

“Below,” was my reply.

In an instant a basket was lowered with milk, a biscuit, and an egg. My uncle was fearful to be too ready with his supply of food. I drank the milk first, for thirst had nearly deadened hunger. I then, much refreshed, ate my bread and hard egg.

They were now at work at the wall. I could hear a pick-axe. Wishing to escape all danger from this terrible weapon I made a desperate struggle, and the belt, which surrounded my waist and which had been hitched on a stone, gave way. I was free, and only escaped falling down by a rapid motion of my hands and knees.

In ten minutes more I was in my uncle’s arms, after being two days and nights in that horrible prison. My occasional delirium prevented me from counting time.

I was weeks recovering from that awful starvation adventure: and yet what was that to the hideous sufferings I now endured?

After dreaming for some time, and thinking of this and other matters, I once more looked around me. We were still ascending with fearful rapidity. Every now and

then the air appeared to check our respiration as it does that of aëronauts when the ascension of the balloon is too rapid. But if they feel a degree of cold in proportion to the elevation they attain in the atmosphere, we experienced quite a contrary effect. The heat began to increase in a most threatening and exceptional manner. I cannot tell exactly the mean, but I think it must have reached 122 degrees of Fahrenheit.

What was the meaning of this extraordinary change in the temperature? As far as we had hitherto gone, facts had proved the theories of Davy and of Lidenbrock to be correct. Until now, all the peculiar conditions of refractory rocks, of electricity of magnetism, had modified the general laws of nature, and had created for us a moderate temperature; for the theory of the central fire, remained, in my eyes, the only explainable one.

Were we, then, going to reach a position in which these phenomena were to be carried out in all their rigor, and in which the heat would reduce the rocks to a state of fusion?

Such was my not unnatural fear, and I did not conceal the fact from my uncle. My way of doing so might be cold and heartless, but I could not help it.

“If we are not drowned, or smashed into pancakes, and if we do not die of starvation, we have the satisfaction of knowing that we must be burned alive.”

My uncle, in presence of this brusque attack, simply shrugged his shoulders, and resumed his reflections—whatever they might be.

An hour passed away, and except that there was a slight increase in the temperature no incident modified the situation. My uncle at last, of his own accord, broke silence.

“Well, Henry, my boy,” he said, in a cheerful way, “we must make up our minds.”

"Make up our minds to what?" I asked, in considerable surprise.

"Well—to something. We must at whatever risk recruit our physical strength. If we make the fatal mistake of husbanding our little remnant of food, we may probably prolong our wretched existence a few hours—but we shall remain weak to the end."

"Yes," I growled, "to the end. That, however, will not keep us long waiting."

"Well, only let a chance of safety present itself,—only allow that a moment of action be necessary,—where shall we find the means of action if we allow ourselves to be reduced to physical weakness by inanition?"

"When this piece of meat is devoured, uncle, what hope will there remain unto us?"

"None, my dear Henry, none. But will it do you any good to devour it with your eyes? You appear to me to reason like one without will or decision, like a being without energy."

"Then," cried I, exasperated to a degree which is scarcely to be explained, "you do not mean to tell me—that you—that you—have not lost all hope."

"Certainly not," replied the Professor, with consummate coolness.

"You mean to tell me, uncle, that we shall get out of this monstrous subterranean shaft?"

"While there is life there is hope. I beg to assert, Henry, that as long as a man's heart beats, as long as a man's flesh quivers, I do not allow that a being gifted with thought and will can allow himself to despair."

What a nerve! The man placed in a position like that we occupied must have been very brave to speak like this.

"Well," I cried, "what do you mean to do?"

"Eat what remains of the food we have in our hands; let us swallow the last crumb. It will be, heaven willing,

our last repast. Well, never mind—instead of being exhausted skeletons, we shall be men.”

“True,” muttered I in a despairing tone, “let us take our fill.”

“We must,” replied my uncle, with a deep sigh—“call it what you will.”

My uncle took a piece of the meat that remained, and some crusts of biscuit which had escaped the wreck. He divided the whole into three parts.

Each had one pound of food to last him as long as he remained in the interior of the earth.

Each now acted in accordance with his own private character.

My uncle, the Professor, ate greedily, but evidently without appetite, eating simply from some mechanical motion. I put the food inside my lips, and hungry as I was, chewed my morsel without pleasure, and without satisfaction.

Hans the guide, just as if he had been eider-down hunting, swallowed every mouthful, as though it were a usual affair. He looked like a man equally prepared to enjoy superfluity or total want.

Hans, in all probability, was no more used to starvation than ourselves, but his hardy Icelandic nature had prepared him for many sufferings. As long as he received his three rix-dollars every Saturday night, he was prepared for anything.

The fact was, Hans never troubled himself about much except his money. He had undertaken to serve a certain man at so much per week, and no matter what evils befell his employer or himself, he never found fault or grumbled, so long as his wages were duly paid.

Suddenly my uncle roused himself. He had seen a smile on the face of our guide. I could not make it out.

“What is the matter?” said my uncle.

"Schiedam," said the guide, producing a bottle of this precious fluid.

We drank. My uncle and myself will own to our dying day that hence we derived strength to exist until the last bitter moment. That precious bottle of Hollands was in reality only half-full; but, under the circumstances, it was nectar.

It took some minutes for myself and my uncle to form a decided opinion on the subject. The worthy Professor swallowed about half a pint and did not seem able to drink any more.

"*Fortrafflig*," said Hans, swallowing nearly all that was left.

"Excellent—very good," said my uncle, with as much gusto as if he had just left the steps of the club at Hamburg.

I had begun to feel as if there had been one gleam of hope. Now all thought of the future vanished!

We had consumed our last ounce of food, and it was five o'clock in the morning!

CHAPTER XLII.

THE VOLCANIC SHAFT.

MAN'S constitution is so peculiar, that his health is purely a negative matter. No sooner is the rage of hunger appeased, than it becomes difficult to comprehend the meaning of starvation. It is only when you suffer that you really understand.

As to any one who has not endured privation having any notion of the matter, it is simply absurd.

With us, after a long fast, some mouthfuls of bread and meat, a little mouldy biscuit and salt beef triumphed over all our previous gloomy and saturnine thoughts.

Nevertheless, after this repast each gave way to his own reflections. I wondered what were those of Hans—the man of the extreme north, who was yet gifted with the fatalistic resignation of Oriental character. But the utmost stretch of the imagination would not allow me to realize the truth. As for my individual self, my thoughts had ceased to be anything but memories of the past, and were all connected with that upper world which I never should have left. I saw it all now, the beautiful house in the Königstrasse, my poor Gretchen, the good Martha; they all passed before my mind like visions of the past. Every time any of the lugubrious groanings which were to be distinguished in the hollows around fell upon my ears, I fancied I heard the distant murmur of the great cities above my head.

As for my uncle, always thinking of his science, he examined the nature of the shaft by means of a torch. He closely examined the different strata one above the other, in order to recognize his situation by geological

theory. This calculation, or rather this estimation, could by no means be anything but approximate. But a learned man, a philosopher, is nothing if not a philosopher, when he keeps his ideas calm and collected; and certainly the Professor possessed this quality to perfection.

I heard him, as I sat in silence, murmuring words of geological science. As I understood his object and his meaning, I could not but interest myself despite my pre-occupation in that terrible hour.

"Eruptive granite," he said to himself, "we are still in the primitive epoch. But we are going up—going up, still going up. But who knows? Who knows?"

Then he still hoped. He felt along the vertical sides of the shaft with his hand, and some few minutes later, he would go on again in the following style—

"This is gniess. This is mocashites—silicious mineral. Good again; this is the epoch of transition, at all events, we are close to them—and then, and then—"

What could the Professor mean? Could he, by any conceivable means, measure the thickness of the crust of the earth suspended above our heads? Did he possess any possible means of making any approximation to this calculation? No.

The manometer was wanting, and no summary estimation could take the place of it.

And yet, as we progressed, the temperature increased in the most extraordinary degree, and I began to feel as if I were bathed in a hot and burning atmosphere. Never before had I felt anything like it. I could only compare it to the hot vapor from an iron foundry, when the liquid iron is in a state of ebullition and runs over. By degrees, and one after the other, Hans, my uncle, and myself had taken off our coats and waistcoats. They were unbearable. Even the slightest garment was not only uncomfortable, but the cause of extreme suffering.

"Are we ascending to a living fire?" I cried; when, to my horror and astonishment, the heat became greater than before.

"No, no," said my uncle, "it is simply impossible, quite impossible."

"And yet," said I, touching the side of the shaft with my naked hand, "this wall is literally burning."

At this moment, feeling as I did that the sides of this extraordinary wall were red hot, I plunged my hands into the water to cool them. I drew them back with a cry of despair.

"The water is boiling!" I cried.

My uncle, the Professor, made no reply other than a gesture of rage and despair.

Something very like the truth had probably struck his imagination.

But I could take no share in either what was going on, or in his speculations. An invincible dread had taken possession of my brain and soul. I could only look forward to an immediate catastrophe, such a catastrophe as not even the most vivid imagination could have thought of. An idea, at first vague and uncertain, was gradually being changed into certainty.

I tremulously rejected it at first, but it forced itself upon me by degrees with extreme obstinacy. It was so terrible an idea that I scarcely dared to whisper it to myself.

And yet all the while certain, and as it were, involuntary observations determined my convictions. By the doubtful glare of the torch, I could make out some singular changes in the granitic strata; a strange and terrible phenomenon was about to be produced, in which electricity played a part.

Then this boiling water, this terrible and excessive heat? I determined as a last resource to examine the compass.

The compass had gone mad!

Yes, wholly stark staring mad. The needle jumped from pole to pole with sudden and surprising jerks, ran round, or as it is said, boxed the compass, and then ran suddenly back again as if it had the vertigo.

I was aware that, according to the best acknowledged theories, it was a received notion that the mineral crust of the globe is never, and never has been, in a state of complete repose.

The modifications caused by the decomposition of internal matter, the agitation consequent on the flowing of extensive liquid currents, the excessive action of magnetism which tends to shake it incessantly, at a time when even the multitudinous beings on its surface do not suspect the seething process to be going on.

Still this phenomenon would not have alarmed me alone; it would not have aroused in my mind a terrible, an awful idea.

But other facts could not allow my self-delusion to last.

Terrible detonations, like heaven's artillery, began to multiply themselves with fearful intensity. I could only compare them with the noise made by hundreds of heavily-laden chariots being madly driven over a stone pavement. It was a continuous roll of heavy thunder.

And then the mad compass, shaken by the wild electric phenomena, confirmed me in my rapidly-formed opinion. The mineral crust was about to burst, the heavy granite masses were about to rejoin, the fissure was about to close, the void was about to be filled up, and we poor atoms to be crushed in its awful embrace!

"Uncle, uncle!" I cried, "we are wholly, irretrievably lost!"

"What, then, my young friend, is your new cause of terror and alarm?" he said, in his calmest manner.

"What fear you now?"

"What do I fear now!" I cried, in fierce and angry

tones. "Do you not see that the walls of the shaft are in motion? do you not see that the solid granite masses are cracking? do you not feel the terrible, torrid heat? do you not observe the awful boiling water on which we float? do you not remark this mad needle? every sign and portent of an awful earthquake?"

My uncle coolly shook his head.

"An earthquake," he replied in the most calm and provoking tone.

"Yes."

"My nephew, I tell you that you are utterly mistaken," he continued.

"Do you not, can you not, recognize all the well-known symptoms——"

"Of an earthquake? by no means. I am expecting something far more important."

"My brain is strained beyond endurance—what, what do you mean?" I cried.

"An eruption, Harry."

"An eruption," I gasped. "We are, then, in the volcanic shaft of a crater in full action and vigor."

"I have every reason to think so," said the Professor in a smiling tone, "and I beg to tell you that it is the most fortunate thing that could happen to us."

The most fortunate thing! Had my uncle really and truly gone mad? What did he mean by these awful words—what did he mean by this terrible calm, this solemn smile?

"What!" cried I, in the height of my exasperation, "we are on the way to an eruption, are we? Fatality has cast us into a well of burning and boiling lava, of rocks on fire, of boiling water, in a word, filled with every kind of eruptive matter? We are about to be expelled, thrown up, vomited, spit out of the interior of the earth, in common with huge blocks of granite, with showers of cinders and

scoriæ, in a wild whirlwind of flame, and you say—the most fortunate thing which could happen to us.”

“Yes,” replied the Professor, looking at me calmly from under his spectacles, “it is the only chance which remains to us of ever escaping from the interior of the earth to the light of day.”

It is quite impossible that I can put on paper the thousand strange, wild thoughts which followed this extraordinary announcement.

But my uncle was right, quite right, and never had he appeared to me so audacious and so convinced as when he looked me calmly in the face and spoke of the chances of an eruption—of our being cast upon mother earth once more through the gaping crater of a volcano!

Nevertheless, while we were speaking we were still ascending; we passed the whole night going up, or to speak more scientifically, in an ascensional motion. The fearful noise redoubled; I was ready to suffocate. I seriously believed that my last hour was approaching, and yet, so strange is imagination, all I thought of was some childish hypothesis or other. In such circumstances you do not choose your own thoughts. They overcome you.

It was quite evident that we were being cast upwards by eruptive matter; under the raft there was a mass of boiling water, and under this was a heaving mass of lava, and an aggregate of rocks which on reaching the summit of the water would be dispersed in every direction.

That we were inside the chimney of a volcano there could no longer be the shadow of a doubt. Nothing more terrible could be conceived!

But on this occasion, instead of Sneffels, an old and extinct volcano, we were inside a mountain of fire in full activity. Several times I found myself asking, what mountain was it, and on what part of the world we should be shot out. As if it were of any consequence!

In the northern regions, there could be no reasonable doubt about that. Before it went decidedly mad, the compass had never made the slightest mistake. From the cape of Saknussemm, we had been swept away to the northward many hundreds of leagues. Now the question was, were we once more under Iceland—should we be belched forth on to the earth through the crater of Mount Hecla, or should we re-appear through one of the other seven fire-funnels of the island? Taking in my mental vision a radius of five hundred leagues to the westward, I could see under this parallel only the little-known volcanoes of the north-west coast of America.

To the east one only existed somewhere about the eightieth degree of latitude, the Esk, upon the island of Jean Mayen, not far from the frozen regions of Spitzbergen.

It was not craters that were wanting, and many of them were big enough to vomit a whole army; all I wished to know was the particular one towards which we were making with such fearful velocity.

I often think now of my folly: as if I should ever have expected to escape!

Towards morning, the ascending motion became greater and greater. If the degree of heat increased instead of decreasing, as we approached the surface of the earth, it was simply because the causes were local and wholly due to volcanic influence. Our very style of locomotion left in my mind no doubt upon the subject. An enormous force, a force of some hundred of combined atmospheres produced by vapors accumulated and long compressed in the interior of the earth, were hoisting us upwards with irresistible power.

But though we were approaching the light of day, to what fearful dangers were we about to be exposed?

Instant death appeared the only fate which we could expect or contemplate.

Soon a dim, sepulchral light penetrated the vertical gallery, which became wider and wider. I could make out to the right and left long dark corridors like immense tunnels, from which awful and horrid vapors poured out. Tongues of fire, sparkling and crackling, appeared about to lick us up.

The hour had come!

"Look, uncle, look!" I cried.

"Well, what you see are the great sulphurous flames. Nothing more common in connection with an eruption."

"But if they lap us round!" I angrily replied.

"They will not lap us round," was his quiet and serene answer.

"But it will be all the same in the end if they stifle us," I cried.

"We shall not be stifled. The gallery is rapidly becoming wider and wider, and if it be necessary, we will presently leave the raft and take refuge in some fissure in the rock."

"But the water, the water, which is continually ascending?" I despairingly replied.

"There is no longer any water, Harry," he answered, "but a kind of lava paste, which is heaving us up, in company with itself, to the mouth of the crater."

In truth, the liquid column of water had wholly disappeared to give place to dense masses of boiling eruptive matter. The temperature was becoming utterly insupportable, and a thermometer exposed to this atmosphere would have marked between 189 and 190 degrees Fahrenheit.

Perspiration rushed from every pore. But for the extraordinary rapidity of our ascent we should have been stifled.

Nevertheless, the Professor did not carry out his proposition of abandoning the raft; and he did quite wisely.

Those few ill-joined beams offered, any way, a solid surface—a support which elsewhere must have utterly failed us.

Towards eight o'clock in the morning a new incident startled us. The ascensional movement suddenly ceased. The raft became still and motionless.

“What is the matter now?” I said, querulously, very much startled by this change.

“A simple halt,” replied my uncle.

“Is the eruption about to fail?” I asked.

“I hope not.”

Without making any reply, I rose. I tried to look around me. Perhaps the raft, checked by some projecting rock, opposed a momentary resistance to the eruptive mass. In this case, it was absolutely necessary to release it as quickly as possible.

Nothing of the kind had occurred. The column of cinders, of scorix, of broken rocks and earth, had wholly ceased to ascend.

“I tell you, uncle, that the eruption has stopped,” was my oracular decision.

“Ah,” said my uncle, “you think so, my boy. You are wrong. Do not be in the least alarmed; this sudden moment of calm will not last long, be assured. It has already endured five minutes, and before we are many minutes older we shall be continuing our journey to the mouth of the crater.”

All the time he was speaking the Professor continued to consult his chronometer, and he was probably right in his prognostics. Soon the raft resumed its motion, in a very rapid and disorderly way, which lasted two minutes or thereabout; and then again it stopped as suddenly as before.

“Good,” said my uncle, observing the hour, “in ten minutes we shall start again.”

"In ten minutes?"

"Yes—precisely. We have to do with a volcano, the eruption of which is intermittent. We are compelled to breathe just as it does."

Nothing could be more true. At the exact minute he had indicated, we were again launched on high with extreme rapidity. Not to be cast off the raft, it was necessary to hold on to the beams. Then the hoist again ceased.

Many times since have I thought of this singular phenomenon without being able to find for it any satisfactory explanation. Nevertheless, it appeared quite clear to me, that we were not in the principal chimney of the volcano, but in an accessory conduit, where we felt the counter shock of the great and principal tunnel filled by burning lava.

It is impossible for me to say how many times this manœuvre was repeated. All that I can remember is, that on every ascensional motion, we were hoisted up with ever-increasing velocity, as if we had been launched from a huge projectile. During the sudden halts we were nearly stifled; during the moments of projection the hot air took away our breath.

I thought for a moment of the voluptuous joy of suddenly finding myself in the hyperborean regions with the cold 30 degrees below zero!

My exalted imagination pictured to itself the vast snowy plains of the arctic regions, and I was impatient to roll myself on the icy carpet of the north pole.

By degrees my head, utterly overcome by a series of violent emotions, began to give way to hallucination. I was delirious. Had it not been for the powerful arms of Hans the guide, I should have broken my head against the granite masses of the shaft.

I have, in consequence, kept no account of what followed for many hours. I have a vague and confused remem-

brance of continual detonations, of the shaking of the huge granitic mass, and of the raft going round like a spinning-top. It floated on the stream of hot lava, amidst a falling cloud of cinders. The huge flames roaring, wrapped us around.

A storm of wind which appeared to be cast forth from an immense ventilator roused up the interior fires of the earth. It was a hot incandescent blast!

At last I saw the figure of Hans as if enveloped in the huge halo of burning blaze, and no other sense remained to me but that sinister dread which the condemned victim may be supposed to feel when led to the mouth of a cannon, at the supreme moment when the shot is fired and his limbs are dispersed into empty space.

CHAPTER XLIII.

DAYLIGHT AT LAST.

WHEN I opened my eyes I felt the hand of the guide clutching me firmly by the belt. With his other hand he supported my uncle. I was not grievously wounded, but bruised all over in the most remarkable manner.

After a moment I looked around, and found that I was lying down on the slope of a mountain not two yards from a yawning gulf into which I should have fallen had I made the slightest false step. Hans had saved me from death, while I rolled insensible on the flanks of the crater.

"Where are we?" dreamily asked my uncle, who literally appeared to be disgusted at having returned to earth.

The eider-down hunter simply shrugged his shoulders as a mark of total ignorance.

"In Iceland?" said I, not positively but interrogatively.

"*Nej*," said Hans.

"How do you mean?" cried the Professor; "no—what are your reasons?"

"Hans is wrong," said I, rising.

After all the innumerable surprises of this journey, a yet more singular one was reserved to us. I expected to see a cone covered by snow, by extensive and wide-spread glaciers, in the midst of the arid deserts of the extreme northern regions, beneath the full rays of a polar sky, beyond the highest latitudes.

But contrary to all our expectations, I, my uncle, and the Iclander, were cast upon the slope of a mountain calcined by the burning rays of a sun which was literally baking us with its fires.

I could not believe my eyes, but the actual heat which

affected my body allowed me no chance of doubting. We came out of the crater half naked, and the radiant star from which we had asked nothing for two months, was good enough to be prodigal to us of light and warmth—a light and warmth we could easily have dispensed with.

When our eyes were accustomed to the light we had lost sight of so long, I used them to rectify the errors of my imagination. Whatever happened, we should have been at Spitzbergen, and I was in no humor to yield to anything but the most absolute proof.

After some delay, the Professor spoke.

“Hem!” he said, in a hesitating kind of way, “it really does not look like Iceland.”

“But supposing it were the island of Jean Mayen?” I ventured to observe.

“Not in the least, my boy. This is not one of the volcanoes of the north, with its hills of granite and its crown of snow.”

“Nevertheless ——”

“Look, look, my boy,” said the Professor, as dogmatically as usual.

Right above our heads, at a great height, opened the crater of a volcano from which escaped, from one quarter of an hour to the other, with a very loud explosion, a lofty jet of flame mingled with pumice stone, cinders, and lava. I could feel the convulsions of nature in the mountain, which breathed like a huge whale, throwing up from time to time fire and air through its enormous vents.

Below, and floating along a slope of considerable angularity, the stream of eruptive matter spread away to a depth which did not give the volcano a height of three hundred fathoms.

Its base disappeared in a perfect forest of green trees, among which I perceived olives, fig trees, and vines loaded with rich grapes.

Certainly this was not the ordinary aspect of the Arctic regions. About that there could not be the slightest doubt.

When the eye was satisfied at its glimpse of this verdant expanse, it fell upon the waters of a lovely sea or beautiful lake, which made of this enchanted land an island of not many leagues in extent.

On the side of the rising sun was to be seen a little port, crowded with houses, and near which the boats and vessels of peculiar build were floating upon azure waves.

Beyond, groups of islands rose above the liquid plain, so numerous and close together as to resemble a vast beehive.

Towards the setting sun, some distant shores were to be made out on the edge of the horizon. Some presented the appearance of blue mountains of harmonious conformation; upon others, much more distant, there appeared a prodigiously lofty cone, above the summit of which hung dark and heavy clouds.

Towards the north, an immense expanse of water sparkled beneath the solar rays, occasionally allowing the extremity of a mast or the convexity of a sail bellying to the wind, to be seen.

The unexpected character of such a scene added an hundredfold to its marvellous beauties.

"Where can we be?" I asked, speaking in a low and solemn voice.

Hans shut his eyes with an air of indifference, and my uncle looked on without clearly understanding.

"Whatever this mountain may be," he said, at last, "I must confess it is rather warm. The explosions do not leave off, and I do not think it is worth while to have left the interior of a volcano and remain here to receive a huge piece of rock upon one's head. Let us carefully descend the mountain and discover the real state of the case. To confess the truth, I am dying of hunger and thirst."

Decidedly the Professor was no longer a truly reflective character. For myself, forgetting all my necessities, ignoring my fatigues and sufferings, I should have remained still for several hours longer—but it was necessary to follow my companions.

The slope of the volcano was very steep and slippery; we slid over piles of ashes, avoiding the streams of hot lava which glided about like fiery serpents. Still, while we were advancing, I spoke with extreme volubility, for my imagination was too full not to explode in words.

“We are in Asia!” I exclaimed; “we are on the coast of India, in the great Malay islands, in the centre of Oceana. We have crossed the one half of the globe to come out right at the antipodes of Europe!”

“But the compass!” exclaimed my uncle; “explain that to me!”

“Yes,—the compass,” I said, with considerable hesitation. “I grant that is a difficulty. According to it, we have always been going northward.”

“Then it lied.”

“Hem—to say it lied is rather a harsh word,” was my answer.

“Then we are at the north pole—”

“The pole—no—well—well I give it up,” was my reply.

The plain truth was, that there was no explanation possible. I could make nothing of it.

And all the while we were approaching this beautiful verdure, hunger and thirst tormented me fearfully. Happily, after two long hours’ march, a beautiful country spread out before us, covered by olives, pomegranates, and vines, which appeared to belong to anybody and everybody.

In the state of destitution into which we had fallen, we were not particular to a grape.

What delight it was to press these delicious fruits to our lips, and to bite at grapes and pomegranates fresh from the

vine. Not far off, near some fresh and mossy grass, under the delicious shade of some trees, I discovered a spring of fresh water, into which we voluptuously laved our faces, hands, and feet.

While we were all giving way to the delights of new-found pleasures, a little child appeared between two tufted olive trees.

"Ah," cried I, "an inhabitant of this happy country."

The little fellow was poorly dressed, weak and suffering, and appeared terribly alarmed at our appearance. Half naked, with tangled, matted and ragged beards, we did look supremely ill-favored; and unless the country was a bandit land, we were not unlikely to alarm the inhabitants!

Just as the boy was about to take to his heels, Hans ran after him, and brought him back, despite his cries and kicks.

My uncle tried to look as gentle as possible, and then spoke in German.

"What is the name of this mountain, my friend?"

The child made no reply.

"Good," said my uncle, with a very positive air of conviction, "we are not in Germany."

He then made the same demand in English, of which language he was an excellent scholar.

The child shook its head and made no reply. I began to be considerably puzzled.

"Is he dumb?" cried the Professor, who was rather proud of his polyglot knowledge of languages, and making the same demand in French.

The boy only stared in his face,

"I must perforce try him in Italian," said my uncle, with a shrug.

"*Dove noi siamo?*"

"Yes, tell me where we are?" I added, impatiently and eagerly.

Again the boy remained silent.

"My fine fellow, do you or do you not mean to speak?" cried my uncle, who began to get angry. He shook him. and spoke another dialect of the Italian language.

"*Come si noma questa isola?*"—what is the name of this island?

"Stromboli," replied the rickety little shepherd, dashing away from Hans and disappearing in the olive groves.

We thought little enough about him.

Stromboli! What effect on the imagination did these few words produce! We were in the centre of the Mediterranean; amidst the Eastern archipelago of mythological memory; in the ancient Strongylos, where Æolus kept the wind and the tempest chained up. And those blue mountains, which rose towards the rising of the sun, were the mountains of Calabria.

And that mighty volcano which rose on the southern horizon was Etna, the fierce and celebrated Etna!

"Stromboli! Stromboli!" I repeated to myself.

My uncle played a regular accompaniment to my gestures and words. We were singing together like an ancient chorus.

Ah—what a journey—what a marvellous and extraordinary journey! Here we had entered the earth by one volcano, and we had come out by another. And this other was situated more than twelve hundred leagues from Sneffels, from that drear country of Iceland cast away on the confines of the earth. The wondrous chances of this expedition had transported us to the most harmonious and beautiful of earthly lands. We had abandoned the region of eternal snows for that of infinite verdure, and had left over our heads the grey fog of the icy regions to come back to the azure sky of Sicily!

After a delicious repast of fruits and fresh water, we again continued our journey in order to reach the port of



OUR CONDITION AT THE END OF THE JOURNEY

Stromboli. To say how we had reached the island would scarcely have been prudent. The superstitious character of the Italians would have been at work, and we should have been called demons vomited from the infernal regions. It was therefore necessary to pass for humble and unfortunate shipwrecked travellers. It was certainly less striking and romantic, but it was decidedly safer.

As we advanced, I could hear my worthy uncle muttering to himself—

“But the compass. The compass most certainly marked north. This is a fact I cannot explain in any way.”

“Well, the fact is,” said I, with an air of disdain, “we must not explain anything. It will be much more easy.”

“I should like to see a professor of the Johanneum Institution, who is unable to explain a cosmic phenomenon—it would indeed be strange.”

And speaking thus; my uncle, half naked, his leathern purse round his loins, and his spectacles upon his nose, became once more the terrible Professor of Mineralogy.

An hour after leaving the wood of olives, we reached the fort of San Vicenza, where Hans demanded the price of his thirteenth week of service. My uncle paid him, with very many warm shakes of the hand.

At that moment, if he did not indeed quite share our natural emotion, he allowed his feelings so far to give way as to indulge in an extraordinary expression for him.

With the tips of two fingers he gently pressed our hands and smiled.

CHAPTER XLIV.

THE JOURNEY ENDED.

THIS is the final conclusion of a narrative which will be probably disbelieved even by people who are astonished at nothing. I am, however, armed at all points against human incredulity.

We were kindly received by the Strombolite fishermen, who treated us as shipwrecked travellers. They gave us clothes and food. After a delay of forty-eight hours, on the 31st of September a little vessel took us to Messina, where a few days of delightful and complete repose restored us to ourselves.

On Friday, the 4th October, we embarked in the *Volturnus*, one of the postal packets of the Imperial Messagerie of France; and three days later we landed at Marseilles, having no other care on our minds but that of our precious but erratic compass. This inexplicable circumstance tormented me terribly. On the 9th of October, in the evening, we reached Hamburg.

What was the astonishment of Martha, what the joy of Gretchen! I will not attempt to define it.

"Now then, Harry, that you really are a hero," she said, "there is no reason why you should ever leave me again."

I looked at her. She was weeping tears of joy.

I leave it to be imagined if the return of Professor Hardwigg made or did not make a sensation in Hamburg. Thanks to the indiscretion of Martha, the news of his departure for the Interior of the Earth had been read over the whole world.

No one would believe it—and when they saw him come back in safety they believed it all the less.

But the presence of Hans and many stray scraps of information by degrees modified public opinion.

Then my uncle became a great man, and I the nephew of a great man; which, at all events, is something. Hamburg gave a festival in our honor. A public meeting of the Johanneum Institution was held, at which the Professor related the whole story of his adventures, omitting only the facts in connection with the compass.

That same day he deposited in the archives of the town the document he had found written by Saknussem, and he expressed his great regret that circumstances, stronger than his will, did not allow him to follow the Icelandic traveller's track into the very Centre of the Earth. He was modest in his glory, but his reputation only increased.

So much honor necessarily created for him many envious enemies. Of course they existed, and as his theories, supported by certain facts, contradicted the system of science upon the question of central heat, he maintained his own views both with pen and speech against the learned of every country. Although I still believe in the theory of central heat, I confess that certain circumstances, hitherto very ill defined, may modify the laws of such natural phenomena.

At the moment when these questions were being discussed with interest, my uncle received a rude shock—one that he felt very much. Hans, despite everything he could say to the contrary, quitted Hamburg; the man to whom we owed so much would not allow us to pay our deep debt of gratitude. He was taken with nostalgia; a love for his Icelandic home.

"*Farvel*," said he, one day, and with this one short word of adieu, he started for Reykjawik, which he soon reached safely.

We were deeply attached to our brave eider-duck hunter. His absence will never cause him to be forgotten by those whose lives he saved, and I hope, at some not distant day, to see him again.

To conclude, I may say that our Journey into the Interior of the Earth created an enormous sensation throughout the civilized world. It was translated and printed in many languages. All the leading journals published extracts from it, which were commentated, discussed, attacked, and supported with equal animation by those who believed in its episodes, and by those who were utterly incredulous.

Wonderful! My uncle enjoyed during his lifetime all the glory he deserved; and he was even offered a large sum of money, by Mr. Barnum, to exhibit himself in the United States; while I am credibly informed by a traveller that he is to be seen in waxwork at Madame Tussaud's!

But one care preyed upon his mind, a care which rendered him very unhappy. One fact remained inexplicable—that of the compass. For a learned man to be baffled by such an inexplicable phenomenon was very aggravating. But heaven was merciful, and in the end my uncle was happy.

One day, while he put some minerals belonging to his collection in order, I fell upon the famous compass and examined it keenly.

For six months it had lain unnoticed and untouched.

I looked at it with curiosity, which soon became surprise. I gave a loud cry. The Professor, who was at hand, soon joined me.

“What is the matter?” he cried.

“The compass!”

“What then?”

“Why its needle points to the south and not to the north.”

"My dear boy, you must be dreaming."

"I am not dreaming. See the poles are changed."

"Changed!"

My uncle put on his spectacles, examined the instrument, and leaped with joy, shaking the whole house.

A clear light fell upon our minds.

"Here it is!" he cried, as soon as he had recovered the use of his speech, "after we had once passed Cape Saksussemm, the needle of this compass pointed to the southward instead of the northward."

"Evidently."

"Our error is now easily explained. But to what phenomenon do we owe this alteration in the needle!"

"Nothing more simple."

"Explain yourself, my boy. I am on thorns."

"During the storm, upon the Central Sea, the ball of fire which made a magnet of the iron in our raft, turned our compass topsy-turvy."

"Ah!" cried the Professor, with a loud and ringing laugh, "it was a trick of that inexplicable electricity."

From that hour my uncle was the happiest of learned men, and I the happiest of ordinary mortals. For my pretty Virland girl, abdicating her position as ward, took her place in the house in King Street (Königstrasse) in the double quality of niece and wife.

We need scarcely mention that her uncle was the illustrious Professor Hardwigg, corresponding member of all the scientific, geographical, mineralogical and geological societies of the five quarters of the globe.

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